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DISSERTATION

ON

SIMPLE FEVER,

OR ON

FEVER CONSISTING OF ONE PAROXYSM ONLY.

Medicina igitur adhuc taliter comparata eſt, ut fuerit magis oſtenta, quam elaborata: etiam magis elaborata quam amplificata

Bacon, Aug. Sc. Lib. ii. Ch. i.

Solent autem homines naturam tanquam ex præalta turri et e longe deſpicere, et circa generalia nimium occupari; quando ſi decendere placuerit et ad particularia accedere, reſque ipſas attentius et deligentius inſpicere, magis vera et utilia fieret comprehenſio.

Ibid.

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GENERAL OBSERVATIONS.

FEVER is a diſeaſe, the exiſtence of which no man could have the leaſt ſuſpicion of, ſuppoſing him acquainted with the ſtructure of the body, the properties of the ſolids and fluids, the various operations which go on in it in health, the manner in which they take place, the powers which produce them, the connection of the body and the mind, as well as theſe are known at this day to phiſiologiſts, anatomiſts, or thoſe who have ſtudied medicine itſelf, or any of the branches of knowledge conducive, or which have been thought conducive to it. It is therefore only to be known by obſerving it in the diſeaſed bodies of men afflicted with this diſtemper. Many are the authors who have deſcribed it, both ancient and modern. It may therefore be ſuppoſed that the hiſtory of fever ſhould have been rendered very perfect by this time, ſince it is one of the moſt frequent diſeaſes, and has been in all ages, and in all countries, more eſpecially as it is likewiſe one of the moſt fatal; and as it ſo occupies the whole ſyſtem, as to abſorb during its continuance all the faculties, both of the body and the mind, in a greater or leſs degree.

Every man, however, who has read the various deſcriptions of fever which have been given by authors ancient or modern, of one country or of another, becomes immediately ſenſible, that neither its cauſes, riſe, progreſs, or termination, are thoroughly known, or perfectly deſcribed, and of this he will be more fully perſuaded, if he has frequently had occaſion to ſee the diſeaſe.

The hiſtory of fever, therefore, is by no means thoroughly underſtood. That its treatment is not underſtood thoroughly appears clearly, as the practitioners of different countries, who attend patients in this diſeaſe, nay of the ſame country, town, and even diſtrict, although men of great learning in medicine, employ very different modes.

This ſubject, therefore, is not exhauſted. Many phyſicians have laboured, if I may uſe the metaphor, in the geography and culture of this country. But the geography is far from being delineated, the culture is far from being brought to perfection. The author of this treatiſe can only meaſure a few baſes, carry on a few triangles, examine perhaps the ſoil of a few fields, cultivate ſome yards on the ſurface, or bring out ſome of thoſe treaſures which lie deeper. Many and many new obſervers, many and many new laborers muſt be employed to bring the whole knowledge and cultivation of it to perfection.

Since, as has been already ſaid, nothing but the obſervation of the appearances which take place in a perſon afflicted with fever, nothing but ſeeing the effects of medical inſtruments employed in the diſeaſe, can give mankind any idea, either of its hiſtory, or treatment. Nothing can give any man a power of improving the knowledge in this diſeaſe, either as to its hiſtory, or cure, excepting having ſeen it frequently; and one not acquainted with the previous knowledge of it, which exiſts in the world, cannot tell whether he has made any improvement or no. What has gone before, as far as has been related, is open to every man who will take the pains to read and give attention to what is written on the diſeaſe.

It is natural for a reader to enquire, what opportunities of obſervation a man has had who pretends to make ſome improvement, that he may not waſte his time in peruſing what contains nothing but dreams. Therefore, it is not impertinent to ſay, that beſides all other opportunities of obſerving this diſeaſe, the author has been for upwards of twenty years one of the three phyſicians of St. Thomas's Hoſpital, whoſe walls have contained nearly four thouſand patients every year, where the proportion of fevers to other diſeaſes is much greater than the general proportion. As fevers, and indeed all acute diſeaſes give a preference in the admiſſion of a patient, and many fevers originate in this, as well as in all hoſpitals. His attention has been particularly drawn to this, and other diſeaſes, by deſcribing them, and pointing out the manner of their treatment to ſtudents in medicine, three times a year, for thirty years. He hopes therefore, that it may not be thought improper in him to try to contribute his mite to forward the power of medicine, by endeavouring to diſtinguiſh this diſeaſe, and aſſiſt in extricating mankind from its painful and fatal effects.

Fever has obtained its name, in Greek, Latin, Arabic and Perſian, principally from the idea of heat, *Pur*, in Greek, fire; *febris*, in Latin, from *fervere*, to burn, &c.

In the language of this country, the vulgar, if they are hot, ſay that they are in a fever. The intolerable ſenſation of heat, which is often expreſſed by patients afflicted with this diſeaſe, I not only know by the complaints of patients, but have felt the excruciating effects of it myſelf.

It has been an idea that many practitioners in the art of healing have cheriſhed, that in every diſeaſe there is ſome appearance, which being preſent, the diſeaſe is preſent; being abſent, the diſeaſe is abſent. It is indeed ſo flattering a proſpect, and would render a knowledge of the diſeaſe ſo perfectly eaſy, that men who have conſidered themſelves in the line of medicine, have conſtantly been extremely apt to give way to the deluſion. It is as if, whenever a ſailor approached an iſland, where there were chalk cliffs, he ſhould immediately conclude them to be the ſnowy cliffs of Albion, and the iſland therefore of Great Britain; or on the contrary, if he fell in with the Columns of Stafa, that he had fallen in with the Giants Cauſeway, of Irene. There are few appearances (ſymptom is the Greek name for appearance) that never take place excepting in one particular diſeaſe; and ſtill fewer particular diſeaſes which do not often take place without any one peculiar ſymptom. An inflammation, to give a ſtrong inſtance, but perfectly grounded on anatomical diſſection, may take place in the pleura without pain, ſince not only adheſions have been found on diſſection, but ſuppuration both above and below the pleura, when the patient has never complained of any pain in the ſide.

Fever, of all other diſeaſes, is that one in which a pathognomic ſymptom is leaſt to be depended upon; that is to ſay, an appearance which does not take place when there is no fever, or a fever does not take place when there is no ſuch appearance.

Let me examine thoſe appearances which have been conſidered as pathognomic.

Heat, that ſymptom which I have ſhown as preponderating in the ideas of all thoſe nations whoſe medical knowledge we are acquainted with, certainly is not a pathognomic ſymptom of fever.

Until the time of Van Helmont, there was no means of meaſuring what many Chemiſts call at preſent the apparent heat of the body. He firſt invented a meaſure of heat by the expanſion of air contained in a glaſs globe, puſhing up when heated a fluid through a ſmall cylinder, and allowing when cold the fluid to deſcend in the ſame cylinder, and by that means, meaſure the degree of heat by the expanſion or contraction of bodies. This inſtrument has been ſince much improved; ſo that by the difference between the expanſion of glaſs and mercury, as well as between other ſolids, fluids and vapors, we can meaſure very exactly what has been called the apparent heat of bodies. By the application of this inſtrument to the bodies of patients afflicted with fever, the author has often found the heat leſs than that which was found in the bodies of men in perfect health, although all the other appearances which conſtituted fever were preſent, even when there was foulneſs of the tongue, dryneſs of the ſkin, frequency of the pulſe, delirium, and the patient felt himſelf very hot. That is to ſay, the heat of the human body being meaſured by a very ſmall thermometer, the ball being only the fourth part of an inch in diameter, and the cylindric ſtem proportionally ſmall; the ball being put under the tongue, the mouth kept ſhut for four or five minutes, and the reſpiration carried on through the noſtrils, the thermometer has been at 96°, 95°, or even 94°, in ſome caſes. On the other hand, when a patient has felt himſelf very cold, this meaſure of heat has ſhown that the apparent heat of the body, by a thermometer applied in the ſame manner, was 104° or 105°. This kind of meaſure of heat being totally unknown till the time of Van Helmont, and not being brought to any kind of perfection till long after his time, we cannot ground any reaſoning upon it that can be at all connected with the ideas of Greece, or upon any deſcription of the feelings of mankind with regard to heat in fevers, where this inſtrument was not known nor employed.

Bring next into conſideration the feel of the patient, with regard to heat and cold. Although his feel of heat is more frequent and of greatly longer continuance than his feel of cold in any fever, which is not fatal in a few hours, yet he undoubtedly feels himſelf frequently exceſſively cold; very often, at the beginning of the firſt attack of fever; often at the beginnings of the attacks, when fevers have intermiſſions; not frequently, but not very uncommonly, in the middle of fevers, in which the patient, during the courſe of the diſeaſe, is never free from fever.

Another perſon applying his hand, &c. to the body of a perſon afflicted with fever, feels a part of the body hot ſometimes, when the patient himſelf feels it cold: ſometimes it may be felt to change from hot to cold in almoſt an inſtant, or from cold to hot in the ſame ſmall period of time; and this by no means conſonant, either to the feel of the perſon afflicted or to the thermometer.

Heat therefore, conſidering it in any way that it can be meaſured, cannot be taken as a pathognomic ſymptom of fever; that is, an appearance which always takes place when a fever is preſent, and is always abſent when a fever is abſent.

It will hardly be thought neceſſary here to conſider heat in the body, which is not ſhown by any of thoſe meaſures which I have pointed out, and which has lately been conceived to exiſt in matter, without being ſenſible, by producing expanſion of ſolids, fluids or vapors, or ſenſible to the feelings of mankind or other animals.

Some authors and practitioners have conceived, that cold followed by heat conſtituted a fever; but every man who has been converſant in this diſeaſe, and has attended to its attacks, knows perfectly that it often begins without any cold, meaſured either by the thermometer, the ſenſation of the patient, or feel of a by-ſtander.

A leſſer degree of heat, meaſured by the thermometer, the feel of the patient, or of a by-ſtander, we call cold: In ſome caſes of fever the author has meaſured the heat, at the firſt approach of an attack, in all theſe ways, and very frequently throughout the diſeaſe, without ever finding a greater degree of cold than the heat natural to the body, from the firſt beginning, till the final end of the diſeaſe. This will be undoubtedly confirmed by the obſervation of practitioners and relations of authors.

On the other hand, cold, conſidered in the ſenſe I have explained, has frequently taken place, according to all the above meaſures, in diſeaſes, which no practitioner has ever conſidered as fever; in hyſteric affection for inſtance. Cold therefore cannot be deemed a pathognomic ſymptom of this diſeaſe.

Frequency of the pulſe has been more generally conſidered as a pathognomic ſymptom of fever. The pulſe, that is to ſay, the contraction and relaxation of the arteries, which is readily felt in any artery lying near the ſkin, eſpecially if it be only covered by the ſkin, enumerates almoſt always the number of contractions of the left ventricle of the heart. In perſons in health, indeed in animals in general in health, the number of contractions of the left ventricle of the heart is wonderfully uniform; in mankind, at an adult age, it is moſt commonly 73 ſtrokes in a minute, ſo that it might be almoſt taken as a meaſure of time: in men hurried with buſineſs of large towns, it varies a little, tho' very little; in perfect health, the number of contractions is rarely found to be leſs than 70, or more than 75 in a minute. We find not uncommonly idioſyncraſies; that is, diſpoſitions in particular perſons, where the number of contractions of the ventricle is fewer; others where there are more than 73 contractions in a minute; but in thoſe perſons, in which this takes place, whatever be their number of contractions in a given time, it remains uniform; that is to ſay, if the number of contractions of the ventricle be 60, then it is always 60 in health; if it be 80, then it is always 80 in health: it is very rare to find in ſuch idioſyncraſies the number leſs than 60, or more than 80, and theſe idioſyncraſies are very uncommon, one not happening in an hundred times; or if we take thoſe in which the number is more than 75, or leſs than 70, not one in a thouſand. The contractions in children are more numerous, and more eaſily diſturbed; in old men not uncommonly leſs. I felt the pulſe of an old man in the Charter Houſe, whoſe natural number did not exceed 26 contractions in a minute. The number of contractions in old perſons is alſo leſs regular. In the preſent enquiry, we may lay aſide what happens in children and in old men, and conſider the natural number of contractions to be 73 in a minute.

When then frequency of the pulſe is taken as a pathognomic ſymptom of fever, it is meant, that the pulſations of the arteries, that is the contraction of the left ventricle of the

the heart, is more than 73 in number in a minute. But it is by no means agreed by authors or practitioners, that any encreaſe above 73 in a minute is fever.

It has therefore been a queſtion, what the increaſe is that conſtitutes the pathognomic ſymptom of fever; ſome have taken 90 pulſations in a minute, or any greater number, as the number which conſtituted fever. Fever, therefore, according to their ſentiments, is always preſent, when in a perſon whoſe natural number of pulſations is 73 in a minute, become 90 or more in a minute: this has induced many to call all diſeaſes fever, in which the pulſation of the arteries aroſe to 90 ſtrokes or more in a minute. Every man may employ any term, in any ſenſe he chooſes, provided he defines it. Suppoſe therefore we admit that all diſeaſes in which the number of pulſations are above 90 in a minute to be fevers, let me examine what diſeaſes muſt be included under this name.

Suppoſing that there is a ſpaſmodic contraction of the inteſtines, it frequently happens, that the pulſations become more than 100 in a minute; then this man muſt be ſaid to be afflicted with fever. If we exhibit to this man a doſe of ſpices, the contraction of the inteſtines is carried off, and the pulſe ſoon returns to its natural ſtate. If a perſon goes down a dance, with more than ordinary velocity, the pulſations are frequently more than 100 in a minute, and therefore this perſon is afflicted with fever. If a woman ſhould ſuddenly meet the object of her love, her pulſations are often 100 in a minute, ſhe then likewiſe is afflicted with fever. But theſe, and an hundred other caſes which might eaſily be brought, are very far from the diſeaſe which I am about to deſcribe, very far from the fevers of all the great practitioners of Greece, Arabia, or even among the majority in modern times.

Frequency of the contractions of the left ventricle of the heart may be preſent without fever; on the other hand, fever may be preſent without more numerous contractions of the ventricle of the heart. The author has ſeen in many inſtances a fever take place, and go on as a continued fever, ſo that in the middle of the ſecond week, the pulſe has been frequent from 100 to 110, or even more, the tongue covered with a brown fur and dry, the ſkin dry, great depreſſion of ſtrength, coſtiveneſs, violent pain in the forehead, the eyes ſtupid, delirium, ſtrong evening exacerbations; in ſuch caſes the Author has known the pulſations become as few as 60, 50 or 45, even in a minute, all the other appearances of the diſeaſe remaining the ſame, that is to ſay, as they are above deſcribed, the fever even encreaſing in all other reſpects. This ſmall number of pulſations, after continuing for two or three days, has given place to a number of pulſations as great as before, ſo that if a man had attended to the other circumſtances of the diſeaſe, and not felt the pulſe, he would have had no reaſon to ſuſpect that the pulſations had been fewer during that time. This the author has frequently ſhewn to the pupils attending St. Thomas's

Hoſpital, as it was ſhown to him by Dr. Cullen, Sir John Pringle, &c. &c. It has been obſerved by many practitioners, and ſome authors. We certainly ſhould not in this caſe affirm, that during this time a patient is free from fever: therefore a fever may be preſent, and that in a great and even fatal degree, without an encreaſe of the number of pulſations of the arteries, that is, contractions of the left ventricle of the heart.

The number of the pulſations of the arteries is therefore not a pathognomic ſymptom of fever, ſince they may be numerous without a fever being preſent, and leſs numerous than they are naturally, even in the worſt caſe of fever.

If we examine the reſtleſſneſs, anxiety, ſtate of the tongue, head-ach, or any other of the ſymptoms which often take place in fever, we ſhall find that they alſo may be preſent when there is no fever, and abſent in a patient afflicted with this diſeaſe, and therefore we cannot allow that there is any pathognomic ſymptom of fever.

DEFINITION OF FEVERS.

MANY diſeaſes have been called fever, even by practitioners of great knowledge and obſervation, which the author does not mean to include in the number of fevers. In the firſt place, he excludes all affections of the ſyſtem which depend upon any other diſeaſe. Thus, in phlegmonous inflammations, in pleuriſy, for inſtance, there is often frequency of the pulſe, greater ſtrength of the pulſe, and hardneſs; foulneſs of the tongue; loſs of appetite; want of ſleep. If the inflammation be carried off, all theſe appearances ſubſide of themſelves, they only depending upon the inflammation of the pleura, and therefore are, according to this rule, not to be conſidered as fever. So in inflammation of the inteſtines there is frequency of the pulſe, with contraction, hardneſs, and frequently obſtruction, pain in the forehead, dryneſs, and duſky colour of the ſkin; the tongue is covered with a brown fur, with great depreſſion of muſcular ſtrength, convulſive contractions in the extremities, nauſea and vomiting, coſtiveneſs, &c. If the inflammation of the inteſtines is carried off, theſe appearances all go off, they depending entirely upon the inflammation of the inteſtines, and, therefore, according to this rule, cannot be conſidered as fever. In eryſipelitous inflammation, that is inflammation of the ſkin, all the laſt enumerated ſymptoms may ariſe. This inflammation may be cured by the application of alkahol diluted with water, and all the ſymptoms affecting the other parts of the ſyſtem diſappearing, they cannot be conſidered as fever. The ſame ſymptoms may ariſe in the dyſentery, and if the inteſtines are reſtored to their natural ſtate, go off, and therefore cannot be conſidered as fever. In gangrene and mortification, ſimilar ſymptoms may ariſe, and continue, notwithſtanding that the dead part is cut off; ſtill I do not include them in fever, becauſe the wound has a tendency to gangrene and mortify, and does actually, in a great proportion of caſes, gangrene and mortify. It is this diſpoſition to gangrene and mortification which keeps up theſe appearances, and therefore they depend upon another diſeaſe, and are not to be included in fevers, for fever does not give a wound a tendency to gangrene and mortify. If theſe appearances then conſtituted a fever, they would not give a wound a tendency to gangrene and mortify. If a phlegmonous inflammation riſes in the parts ſurrounding the dead part when it is not cut off, theſe ſymptoms do not appear at all, or if they have taken place they ſubſide. So in like manner, if the dead part be amputated, and the wound has a diſpoſition to good ſuppuration, which it has ſometimes, although rarely, then the appearances, which I have laſt enumerated, go off if they had taken place, or if they had not taken place before, they do not ariſe. So in rheumatiſm, afflicting a particular part of the body, or taking place in various parts by metaſtaſis, it happens frequently that the pulſe becomes hard, full, ſtrong, and frequent; the tongue is covered with a white cruſt, loſs of appetite, great increaſe of all the ſymptoms in the evening, and great relaxation in the morning; but theſe all depend upon the rheumatiſm affecting particular parts of the body, and if all the topical affections ſhould be carried off, then theſe appearances which have been enumerated likewiſe ſubſide, and are not therefore according to the rule laid down a fever. So in tetanus there is frequency together with obſtruction of the pulſe, head-ach, loſs of appetite, nauſea, not uncommonly want of ſleep, delirium; but theſe ſymptoms depending on the ſpaſmodic contraction, or diſpoſition to ſpaſmodic contraction in different muſcles of the body, do not conſtitute a fever. There are many other diſeaſes which might be enumerated that produce affection of the ſyſtem, generally depending upon the continuance of the diſeaſe that gave occaſion to them, none of theſe are for the ſame reaſon to be called fever.

When a diſeaſe of a part of the body produces an affection of the whole ſyſtem, in which there are many appearances ſimilar to thoſe which take place in fever, if upon removing ſuch diſeaſe, the affection of the ſyſtem does not immediately go off, but begins to ſubſide, and continues gradually to ſubſide, ſuch affection, for the ſame reaſon, cannot be called fever.

The next rule is, that a diſeaſe which affects a part of the body only, that is, any particular member of the body, ſuch as an arm, the head, ſtomach, &c. and does not affect the other parts of the ſyſtem, or which produces affection of other parts of the ſyſtem, depending only on the affection of that part, cannot be called fever.

Practitioners not well verſant in this diſeaſe, have frequently ſuppoſed themſelves ſagacious in diſcovering ſuch diſeaſes to be fevers. Thus an hemicrania, which takes place by paroxyſms, which ſometimes begin with coldneſs, and produce frequency of the pulſe, foulneſs of the tongue, loſs of appetite, heat, and which obſerves ſometimes a quotidian, tertian, or quartan type, has been called and conceived to be a fever, of which it has nothing of the eſſence.

It is not to be concluded from what has been ſaid, that a fever cannot exiſt along with any other diſeaſe. A fever may begin firſt, continue for ſome time, and another diſeaſe may ariſe afterwards without carrying off the fever; it may continue along with it; the going off of the ſecond diſeaſe may not carry off the fever; but the other diſeaſe being carried off, all the ſymptoms of fever may ſtill remain, and it may go through its courſe. This ſeems to be a caſe which has been with difficulty underſtood by practitioners. For example, a man ſhall be ſeized with a coldneſs, anxiety, depreſſion of ſtrength; the coldneſs may be followed by heat, frequency of the pulſe may take place, head-ach, foulneſs of the tongue, and other febrile ſymptoms; then there ſhall ariſe after ſome hours, or even after ſome days, pain in the ſide, encreaſed on inſpiration, and conſtant with cough, difficulty of breathing, hardneſs, fullneſs and ſtrength of the pulſe, and all the other ſymptoms of pleuriſy: the pain in the ſide, and all the pleuritic ſymptoms may be removed by bleeding, and other remedies; yet after there is no longer any pain in the ſide, the pain in the forehead, the foulneſs of the tongue, depreſſion of ſtrength, and all the febrile ſymptoms may continue, and the diſeaſe may go through the remaining part of its progreſs juſt as if no pleuriſy had ariſen in it.

Such caſes are rendered more difficult, in as much as it happens, not uncommonly, that another diſeaſe ariſing in fever cures the fever, and all the appearances which continue afterwards are entirely produced, or kept up by this ſecond diſeaſe, the fever having entirely left the body. Thus, if a fever ſhould take place, with coldneſs followed by heat, frequency of the pulſe, pain in the forehead, great depreſſion of muſcular ſtrength, and the other ſymptoms of fever; in two or three hours an inflammation of the inteſtines may ariſe, and cure the fever, although, however, the fever is carried off, the head-ach continues, and foulneſs of tongue, the pulſe becomes more frequent, as well as ſmall, and contracted; but theſe appearances, although they may be the ſame with thoſe which took place in the fever, yet depend upon the inflammation of the inteſtines alone. If the inflammation of the inteſtines be cured by general or topical bleedings, fomentations, and other remedies, which have no tendency to carry off the fever, all theſe appearances will gradually ſubſide, and ceaſe in a very ſhort time after the inflammation of the inteſtines is cured.

It was thought neceſſary, before entering into a deſcription of fever, to conſider theſe preliminary ſubjects. The deſcription of the diſeaſe is next to be entered upon.

A fever is a diſeaſe which no knowledge of the ſtructure of the human body, as far as it is at preſent known, no knowledge of the properties of the fluids, as far as they have hitherto been inveſtigated, no knowledge of the action of the moving parts, as far as they have hitherto been obſerved, could give the ſmalleſt ground of ſuppoſition, that this diſeaſe could ever have exiſted. In ſhowing its hiſtory, therefore, obſervation of the diſeaſe is to be entirely adhered to, without any reaſoning why, or how any thing in it takes place, or without any theory, as it has been called. It would be juſt as fruitleſs, at leaſt for any uſeful purpoſe, as if a geographer were not to deſcribe a country, but reaſon why an hill ſhould be placed in one region, valley in the other; why one ſhore is rocky, another ſandy; inſtead of actually giving the ſituation of the hills and valleys, the rockyneſs or ſandyneſs of the ſhores.

A fever is a diſeaſe which affects the whole ſyſtem; it affects the head, the trunk of the body, the extremities; it affects the circulation, the abſorption, and nervous ſyſtem; it affects the ſkin, muſcular fibres, the membranes; it affects the body and affects likewiſe the mind. It is therefore a diſeaſe of the whole ſyſtem, in every kind of ſenſe, but it does not affect the various parts of the ſyſtem uniformly and equally; but on the contrary, ſometimes one part is much more affected in proportion to the affection of another part; ſometimes thoſe parts which were moſt affected at one time, are leaſt affected at other times, ſo that the appearances which are the principal ones in one fever, are by much the ſlighteſt in another fever, or ſometimes are totally abſent. This has given great ambiguity to this diſeaſe. To deſcribe it, it is neceſſary to ſuppoſe a caſe, in which all the apppearances which ever take place as eſſential to the diſeaſe ſhould be preſent, and in an equal degree, though no ſuch caſe ever happened, eſpecially as the preſence of one appearance does not, in any degree, neceſſarily imply the abſence of another. For inſtance, in moſt fevers there is pain in the forehead, in ſome there is no pain in the forehead; in moſt fevers there is foulneſs of the tongue, in ſome the tongue is of its natural appearance; but the preſence or abſence of head-ach has no influence on the foulneſs of the tongue, and the preſence or abſence of the foulneſs of the tongue has no influence on the head-ach; ſo that there may be great head-ach, and great foulneſs of the tongue, both together in the ſame patient; or there may be no great head-ach, and great foulneſs of the tongue in one patient; or there may be little foulneſs of the tongue, and great head-ach in another patient; or there may be but little foulneſs of the tongue, and little head-ach in another patient; or there may be head-ach with no foulneſs of the tongue in one patient; or there may be foulneſs of the tongue, and no head-ach in another patient; or there may be neither head-ach nor foulneſs of the tongue in another patient; and ſo it may be of any other two ſymptoms whatever, which occur in this diſeaſe.

Fevers take up different times in their natural duration; ſometimes they go through the whole of their natural courſe in eight, ten or twelve hours, ſo that the patient is ſeized with the diſeaſe, all the ſymptoms ariſe which conſtitute the eſſence of it, the natural cure takes place, terminates the diſeaſe; or in other words, a variety of different appearances take place, the diſeaſe is entirely terminated, and health reſtored in this period of time. This, therefore, muſt be conſidered as a complete fever, ſince every thing which is eſſential to fever happens in it. If a man making a journey goes with the velocity of the wind, and another with that of a ſnail, the journey is equally performed, although in different times. If the journey conſiſts of one ſtage, or of many ſtages; in the firſt inſtance, the journey will be completed in one ſtage as perfectly as in the other, it will be completed in the ſeveral ſtages. When a fever goes through its whole courſe in eight, ten, or twelve hours, it has completed its exiſtence as perfectly as if it had taken eight or ten months. If it completes its courſe in one ſtage, it has completed it as perfectly as if it had gone through many ſimilar, or even diſſimilar ſtages. This is clearly the idea of Sydenham, one of the very firſt authors for accurate obſervation, as well as many other great authors and practitioners.

If a diſeaſe completes its courſe in a ſhort time in ſome caſes, and in others takes a longer time in completing its courſe, it is ſometimes beſt to conſider its hiſtory in the one caſe, and ſometimes in the other. If there is not time for the appearances to be obſerved diſtinctly, then undoubtedly we ſhould take thoſe caſes where the courſe of the diſeaſe occupies a longer period of time. If, on the contrary, there is ſufficient time for obſerving with great enough accuracy, all the different appearances in that caſe, it is better to take the diſeaſe which occupies a ſmaller period of time in its courſe, becauſe it is leſs ſubject to be mixed with any other diſorder, the appearances of which may be improperly taken for the appearances of the diſeaſe which is meant to be deſcribed.

A fever which goes through its courſe, and is completely terminated in eight, ten, or twelve hours, gives ſufficient time to obſerve all the eſſential appearances which take place in the diſeaſe, and therefore it is to be firſt attended to.

A fever which terminates in leſs than twenty-four hours, terminates in leſs than a day and night, therefore was called by the Greeks ephemera. Many modern authors, ſuch as Boerhaave, have conſidered any little diſorder that ariſes from exerciſe, eating too large a quantity of food of difficult digeſtion, drinking too much wine, or any other ſuch cauſe of a diſeaſe, which terminated in leſs than twenty-four hours, an ephemera; but theſe, like Boerhaave himſelf, have not been clinical practitioners, that is practitioners who attended any conſiderable number of patients confined to their beds with fevers. The author has ſeen ſeveral fevers in which all the eſſential appearances took place, and terminated in eight, ten, or twelve hours. It is ſuch a fever that I am now, therefore, in the firſt place to deſcribe, taking afterwards all the other varieties which occur.

A fever frequently begins with very marked ſymptoms all at once; that is, a man in perfect health feels himſelf diſeaſed to a great degree, in leſs than a minute. For example, ſuppoſing a man ſitting down to dinner with a great appetite, feels himſelf inſtantly ſo much affected with this diſeaſe as not to be able to touch a morſel. He may be thus ſuddenly affected at any time in the twenty-four hours, but not equally; a great many more fevers begin between eight in the morning and eight in the evening, than take place between eight in the evening and eight in the morning. There is a remarkable difference; according to the author's obſervation, at leaſt ten fevers take place between eight in the morning and eight in the evening, for one that takes place between eight in the evening and eight in the morning.

It is to be remembered, that the hiſtory of fever is to be given here as it ariſes from obſervation, and not from any ſuppoſition. It is not therefore pretended to be underſtood, why this difference of proportion ſhould take place. Some have ſuppoſed that the ſun's paſſage over the meridian has an effect, but there does not appear to be any ground for this, becauſe the number of firſt attacks of fever, which take place at noon, or near it, are not remarkably greater than thoſe which take place two or three hours ſooner or later. In ſhort, fever is a diſeaſe, the whole of the appearances of which have been in no ways accounted for.

The firſt appearance which generally takes place is uneaſineſs and reſtleſſneſs, a general uneaſineſs, the patient feeling himſelf ill, but incapable of fixing upon any particular pain in any part of the body. This uneaſineſs affects the mind at the ſame time. Perhaps in this caſe it is the mind which is firſt affected. It is indeed a propoſition riſked with great doubt, that a diſeaſe ſhould be in the mind, not in its moral ſenſe; thoſe diſorders which are found in the mind, connected with bodily diſeaſe, having been conſidered as ariſing from ſome derangement in the body. This ſubject will be conſidered more fully afterwards, the author offering it with the greateſt diffidence. Along with this uneaſineſs there is a reſtleſſneſs, the patient wiſhing to change his place or poſture frequently; the mind likewiſe cannot reſt upon one object, it often wanders from one to another ſubject. At the ſame time there is a feel of wearineſs which reſiſts the diſpoſition in the patient to change his place and poſture, and reſiſts the diſpoſition of the mind to alter the object of its attention, rendering the wiſh for ſuch conſtant changes ineffectual: with theſe ariſes an actual inability of exerting the muſcular powers, or performing any of the functions of the body; and alſo an actual inability of exerciſing the great faculties of the mind, the powers of perception, memory, arrangement of ideas, and of the judgment, in the ſame degree that they exiſted in health. The degree in which theſe take place is extremely different in the attacks of different fevers; but theſe appearances are very rarely abſent, although indeed they may alſo happen in other diſeaſes.

This inability, which is common both to the body and mind, has been called weakneſs or debility. It appears to the author, that it ought rather to be called depreſſion of ſtrength, as he believes it has been by ſome authors. That is, it is not that the powers of the body are loſt, but they are prevented from acting by the diſeaſe. If the powers of the body were really taken away, then this inability of exerting the powers of the body and the mind would remain after the diſeaſe was removed; but it does not remain, for if the diſeaſe ceaſes in eight, ten, or twelve hours in any of the ways hereafter deſcribed, the inability ceaſes likewiſe, and both the body and mind can exert themſelves with a vigour nearly equal to what they could have done juſt before the diſeaſe began, or in perfect health. If ſuch a weight were laid upon a ſpring moving a machine as to overcome it without deſtroying its elaſticity, that ſpring would be prevented, either altogether, or in a certain degree, from keeping up the motions of the machine; but that unuſual weight being removed, the ſpring would immediately be enabled to perform all its former functions with the ſame force and regularity as before ſuch weight was laid on; whereas when application had been made which diminiſhed the elaſticity of the ſpring, then it could not produce its former effects until means had been taken to reſtore its temper and force.

Along with theſe, but more commonly after them, it frequently happens that the patient feels a ſenſe of cold, the ſame kind of ſenſation that he feels when ſurrounded by a colder medium than he is accuſtomed to; he wiſhes therefore to go near a fire, or into the rays of the ſun, or to put on warmer cloathing; he does not therefore feel a ſenſe of internal but external cold; it is not that ſenſation which is often called a feel of cold in the ſtomach; but it is, as it were, that the patient was in a cold atmoſphere, or put on cold cloaths. This appearance is vaſtly more uncertain than the reſtleſſneſs, ſenſe of uneaſineſs, wearineſs, and inability.

It is not my intention to enter into any phiſiological diſquiſition, becauſe all phiſiology, as far as it is hitherto known, is totally or nearly uſeleſs in explaining any thing which happens in fever; therefore, I do not enter here into any of the ideas that have been held with regard to the cauſes, which have been thought to govern the temperature of the bodies of animals. I proceed, therefore, to relate this ſingular circumſtance, that when a thermometer, applied to a part of the body, ſhows a greater degree of heat, the patient himſelf feels himſelf cold, and ſometimes in that very part where the thermometer ſhows a greater degree of heat. Practitioners have not been ſufficiently correct in relating this phænomenon; for if a man feels cold in the exterior parts of his body as if he were in a cold medium, which is a ſenſation, as has been already mentioned, which takes place in fever, he does not conceive that his tongue is cold; if then a thermometer be placed under the tongue, ſo that the heat meaſured by it is greater than in the natural ſtate; it is not to be taken as contradicting the patient's feeling, becauſe he did not feel that part of his body cold. In the very parts which the patient feels cold, as in the hand, for example, a thermometer ſometimes ſhows a greater degree of heat than it would have ſhown if it had been applied to the hand under all the ſame circumſtances when the patient was in health. This is by no means always the caſe, for it frequently happens, that in the exterior parts of the body, the thermometer accords with the feel of the patient, more frequently indeed in the exterior parts of the body than under the tongue, and as far as we can employ it within the body, or examine the heat of the interior parts by any means. The thermometer ſhows ſometimes in the attack of fever a leſs degree of heat than takes places in the natural ſtate of the body: 94° of Fahrenheit's thermometer is the loweſt that has been obſerved by the author, in as far as the interior degree of heat could be aſcertained with a ſufficient degree of preciſion.

Bodies, by certain means, may be heated only. For example, the rays of the ſun heat bodies; but the abſence of the rays of the ſun, or any action of the ſun, does not cool bodies. In other words, the ſun being on one ſide of the earth heats bodies, but the ſun being on the other ſide of the earth does not cool them. The cold which takes place when the ſun does not heat any part of the earth, ariſes always from cauſes which do not depend upon what part of the earth is objected to the ſun. So friction heats bodies, but the abſence of friction employed in any way does not cool them; when the friction ceaſes, the loſs of heat which it produced is totally dependant upon cauſes with which friction has nothing to do. In other caſes, cauſes which produce heat have ſimilar ones which produce cold. So in fevers, fever produces cold without any other means except the fever itſelf. A phyſician, or a by-ſtander, holding the hand of a perſon in the attack of a fever, feels, in leſs than five ſeconds, a great degree of cold in that hand. A thermometer applied, falls to a lower degree than it would have done if applied ſome ſeconds before, even if it had been previouſly brought up to ſomething more than the ordinary heat of that part of the body, and therefore in a much leſs time than the heat of the body could poſſibly have diffuſed to the ſurrounding medium. In Europe, we always live in an atmoſphere colder than the natural heat of the body, therefore the human body is always hotter. If the cauſe, whatever it may be, that produces this greater degree be removed, and prevents it from acting ſufficiently

ficiently ſtrong, a greater degree of cold, as ſhown by the thermometer, would certainly take place, from the heats being diſſipated to the ſurrounding ſubſtances. But there are parts of the earth where it happens for ſeveral weeks, that the heat of the atmoſphere, and other mediums in which men live, is greater than that of the human body. Whether in ſuch caſes the attacks of fever are attended with greater degree of cold, as pointed out by the thermometer, we have no obſervation; but the author has very good evidence of the ſenſation of cold taking place on the attack of fever, even when the heat of the atmoſphere, in the ſhade, is conſiderably above the natural heat of the body. This heat is very nearly uniform, not varying a degree of Fahrenheit's thermometer in any climate in health, when meaſured under the tongue, or by ſuch means as can be employed to aſcertain the heat in the interior parts of the body. The author therefore would preſume that an attack of fever has the power of diminiſhing the heat, as far as can be judged of by a thermometer, without its being diſſipated to ſurrounding bodies, or diminiſhed by any method by which

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which a leſſer degree of heat is given, by any other means than by fever itſelf. We judge of cold by the feel; that is to ſay, if a ſubſtance of a certain temperature of heat be applied to the ſkin, or the mouth, or the ſtomach, or ſome other parts of the body. We feel a ſenſation of cold on touching the ſkin of a patient in the attack of fever. This ſenſation very often neither accords with the ſenſation of the patient, nor the degree of heat ſhown by the thermometer. This is an appearance ſo extremely unlikely in itſelf, that the author, when it was related to him, thought it quite impoſſible. It may be found in many authors, although not laid down with great preciſion, but frequent attention to the attacks of fevers has convinced him perfectly, that a part which the patient feels cold, feels hot to a by-ſtander, and *è contra*. But this is very far from being always the caſe; it happens often that the patient and the phyſician, when he has his hand upon the arm of his patient, ſhall agree with one another perfectly in their idea of coldneſs, and the thermometer ſhall ſometimes agree, and ſometimes diſagree with them.

In the attack of a ſimple fever, which is at preſent attempted to be deſcribed, the degree of coldneſs meaſured by the feel of the patient, the feel of the by-ſtander, or the thermometer, is extremely unequal in different parts of the body. It is moſt equal to the patient himſelf; but that is common to the general ſenſations of mankind in health; for if a man ſhould ſit in a warm room, and there ſhould be an hole in the door blowing againſt a particular part of his body, although the cold air be not applied to a circle of above two or three inches diameter on the ſurface of his body, he feels univerſally cold. To a thermometer, or a by-ſtander, the cold of different parts of the body frequently feels very unequal, and very fluctuating.

With theſe ſymptoms, a diminution of ſenſation takes place. Senſation is partly an affection of the body, and partly of the mind. In the firſt place, it is neceſſary that ſome impreſſion ſhould be made on ſome part of the body, or at leaſt that ſome mechanical affection ſhould be produced, in order that an idea ſhould be excited in the mind. As for example, the picture of an object muſt be painted upon the retina by the lenſes of the eye, in order that the ſenſation of viſion ſhould take place. It is true, that a man ſometimes may, and does conceive that he ſees an object, light for inſtance, although no ſuch object is painted on the retina; but this is memory, and not ſenſation, for no new idea of any viſible object was ever acquired by ſuch a ſenſation. It is well known, and I believe univerſally allowed, that all new ideas ariſe in the human mind from impreſſions made on the ſenſible parts, except ſuch as ariſe from the conſciouſneſs of its own operations; but an impreſſion may be made on any ſenſible part without exciting any idea in the mind. A man, for example, ſitting on the bench of a play-houſe, had no idea of the hardneſs of the bench when he ſaw Garrick in Lear bring the body of Cordelia upon the ſtage. The mind muſt be vacant to draw its attention to the impreſſions made upon the body, in order that ideas ſhall be excited by ſuch im-

impreſſions. When we ſpeak, therefore, of the ſenſibility of the ſyſtem, we muſt be careful to diſcriminate between theſe two functions, viz. the impreſſion made on the organ, and the ſenſation excited on the mind.

The firſt thing that is to be treated of is, how far the impreſſions made upon the body have their power of exciting ideas in the mind in fever diminiſhed.

In the firſt place, in ſome caſes the impreſſion upon the body muſt be much leſs, when an extremity is really much colder than in a natural ſtate. A ſubſtance likewiſe colder to the thermometer cannot produce the ſame impreſſion of cold upon the ſkin of that extremity that it would if the extremity had been warmer, for the ſenſation of cold depends upon the temperature which the ſkin has been accuſtomed to.

In the ſecond place, the depreſſion of the muſcular power may render the impreſſion upon the body leſs perfect. The muſcles of the eyes, by changing the convexity of the lenſes of the eye, adapt the focus of more or leſs diſtant objects, in ſuch manner as to paint their picture diſtinctly and completely on the retina; but if the muſcles of the eye have their ſtrength depreſſed, they cannot ſo adapt the convexity of the lenſes of the eye as to paint the picture of the object ſo perfectly and diſtinctly, therefore the mind cannot take ſo diſtinct and perfect an idea.

Perhaps the ſame thing may be ſaid of the ear, where it is equally neceſſary that not only the tympanum ſhould have its due tone, but that likewiſe all the muſcles and moving parts which actuate the ſmall bones may have their powers depreſſed, and ſo may the ~~b~~tones of the fibrils.

That cruſt which begins to be formed upon the tongue in general, in the very firſt beginning of the attack of fever, may put the ſubſtances which produce taſte at a greater diſtance from the ſenſible ſurface of it, and ſo may prevent the ſame mechanical effect from being produced. With regard to the noſtrils, if there be any mechanical reaſons why vapours, or ſteams producing the ſenſation of ſmell, ſhould not have the ſame mechanical effect, they are not inveſtigated; but one is diſpoſed to ſuſpect that there is, becauſe the ſenſations communicated by this organ are more apt to be weakened than thoſe of moſt of the others.

It is not worth while to purſue this ſubject of mechanical diminution of ſenſibility to other parts of the body: but the mind certainly is alſo in many caſes affected in ſuch manner as not to be capable of receiving ſenſations, impreſſed with a ſufficient degree of mechanical force upon the body; ſince with regard to the feel, for inſtance, when an extremity is really colder, as when it has been made colder by immerſion in cold water, an application of water of a leſs degree of heat than would otherwiſe have occaſioned a ſenſation of warmth, would produce that ſenſation. Yet in the attack of a fever, ſuch a degree of inſenſibility, with a feel of coldneſs, has in many caſes taken place, that even hot ſubſtances have been applied in ſuch manner as to coagulate, nay, perform the chemical analyſis of the part, without any ſenſation of heat having ariſen in the mind of the patient; and on the other hand, the eye is ſo formed, that however its lenſes may be flattened, or rendered more convex, yet a very tolerable image of a ſubſtance at ſome greater or leſſer diſtance muſt be formed upon the retina; yet ſometimes, at almoſt the beginning of the attack of a ſimple fever, no impreſſion is made upon the mind from ſuch picture.

The faculty, therefore, of receiving impreſſions in the mind is alſo hurt in fever.

But ſenſation is again to be taken in two other lights, to wit, being diſtinct or indiſtinct.

It is an ordinary fallacy that the mind is capable of taking diſtinct impreſſions from the ſame picture made upon the eye, from the ſame vibrations of the fibrils of the ear, from the ſame impreſſion of vapour, of ſteams on the noſtrils, or of ſubſtances applied to the tongue, or to the ſkin, or the other ſenſible parts of the body. It requires an exerciſe of the mind to receive ſuch ideas diſtinctly. There can be no doubt but that a picture of an object may be painted equally on the eye of the rudeſt Indian, and the moſt poliſhed of mankind, but it does not give the Indian the ſame diſtinct idea. But to avoid any thing that might be conceived to ariſe, from refinement of the paſſions, no one would contend that the Indian would be equally ſenſible of the difference of the flower of tormentil, and a tetradynamous plant of Linne with a botaniſt. In the attack of fever, this power of diſtinct ſenſation is diminiſhed in all the organs of the ſenſes: this is one of thoſe things which renders it often difficult to a practitioner to get a clear and diſtinct account of what the patient actually feels. Perhaps this is a ſource of greater error in the deſcription of fevers than any other. Many practitioners have conceived it was even uſeful to ſuggeſt feelings to patients which they had previouſly imagined they ought to feel in a diſeaſe. Many, with a laudable but miſtaken view, have put the patient in mind of a feeling that he may not have attended to, which the patient aſſents to. Some few perhaps to make a ſhow to the by-ſtanders of their being able to feel for the patient, or to divine his feelings. This has rendered the conception of the diſeaſe very erroneous.

The diminution of the power of ſenſation in all theſe ways is very various in the attack of a ſimple fever; but this will be conſidered more fully afterwards.

At the beginning of the attack of a ſimple fever, ſometimes as the very firſt ſymptom, a pain ariſes in the ſmall of the back: it is rather a ſenſe of uneaſineſs than acute pain. It ſeems to occupy the lumbar vertebræ, although it does not refer accurately to any particular part of the ſmall of the back. It might even be conſidered as an affection of the muſcles, and as ariſing from the depreſſion of ſtrength, in conſequence of the want of ſufficient power to ſuſtain readily the weight of the upper parts; but in fever this pain is equally felt if a man is in an horizontal poſture, where the upper parts of the body are ſuſtained by the bed on which the patient lies. It is extremely ſimilar to a pain which takes place from weakneſs; but the pain or uneaſineſs which takes place in the back from weakneſs, is greater when a man is in an erect poſture, whereas, in fever, there is frequently no difference. It is often the very firſt ſymptom which takes place, and even continues for an hour or two before any other ariſes; but it is alſo very frequently abſent. The cauſe of this pain is not at all known. In diſſection of patients who have died of fevers, in which this ſymptom was very conſiderable, nothing has been found in the part where the ſenſation was felt different from the appearances which take place on diſſection of patients who have died of fever, where no ſuch ſymptom was preſent, nor different from what has been found in patients cut off by many other diſeaſes.

Diminution of ſecretion takes place along with theſe appearances in every part of the body. Diminution of ſecretion may ariſe from contraction of the veſſels through which the ſecreted fluid flows from the blood veſſels, or it may ariſe from want of ſufficient force in thoſe veſſels which propel it through the ſecreting veſſels. As the powers of the body are all oppreſſed in the attack of fever, it might be ſuppoſed that this diminution of ſecretion was owing to the depreſſion of ſtrength; but then it is to be obſerved, that the ſecretions continue diminiſhed when the next ſtage of the diſeaſe comes on, when the action of the heart and arteries is evidently conſiderably increaſed; therefore it would ſeem moſt probable that it is contraction of the ſmall veſſels, through which the ſecreted fluid paſſes from the blood veſſels into the cavity of the gland.

Along with theſe appearances, and ſometimes at the very firſt beginning of the attack of fever, the tongue becomes covered with a cruſt of a very particular kind. At firſt it has frequently the appearance of an extremely viſcid fluid juſt covering the upper ſurface of the tongue, but ſometimes at the very beginning it is a ſolid cruſt of a whitiſh colour, adhering ſo firmly to the tongue as not to be capable of being ſcraped off. In a ſimple fever, which is here deſcribed, the author has had no opportunity to examine it by diſſection; but ſimilar cruſts formed in complicated fevers he has examined. This cruſt is ſolid, is ſo connected with the upper ſurface of the tongue as not to be capable of being ſeparated from it by any diſſection. Examined by a microſcope, on making a tranſverſe ſection of the tongue, it gives at firſt ſight the idea of a number of little bags rounded at one end, and tapering off to a kind of ſtalk, much ſuch an appearance as we ſee in cutting any of the fruits of the orange kind; but theſe are not bags containing fluids, but ſolid maſſes, having the ſame properties as the ordinary ſolids of the body, ſuch as a muſcular fibre, &c. when chemically examined. Similar cruſts are formed in a great number of other diſeaſes: this cruſt muſt be formed upon the ſurface of the tongue itſelf, for the maſſes of which it conſiſts are vaſtly too large to paſs through the excretory ducts of the glands, which open upon the ſurface of the tongue.

In a ſimple fever, which is now treated of, this cruſt is ſometimes white, ſometimes verging towards brown. When a ſlimy cruſt is formed at the beginning, the tongue is apt to adhere by it to the roof of the mouth, in ſome degree; but when the cruſt is ſolid at the very firſt, or when being ſlimy at firſt, it becomes afterwards ſolid, there is no more adheſion to the oppoſite parts than in the ſound ſtate of the body, and often not ſo much, as it prevents the ſecretion of fluids from the glands of the tongue, ſo that the tongue is drier than in its natural ſtate. The under ſurface of the tongue, below the point, is hardly ever covered with this matter. The upper ſurface is often not covered with it equally; but generally when the covering is unequal in a ſimple fever, the edges and point are leſs covered than the middle, and towards the root. The membrane of the other parts of the mouth are not incruſted with the ſame kind of matter in a ſimple fever.

It happens at the beginning of the attack of the diſeaſe, that the patient has a ſenſation of

the middle is most exposed to the
rents of air

of ſome light body moving over the hairs which riſe from the ſkin, as if, for inſtance, a number of little inſects were walking over the points of theſe ſmall hairs. This ſenſation we have hardly an Engliſh term to expreſs; it has been called horipelatio. This appearance takes place generally at the very firſt beginning of the diſeaſe, when it is noted at all; for the great ſenſe of reſtleſſneſs, uneaſineſs and anxiety, drown the perception of it in the patient in many caſes where it is actually preſent, and render it exceedingly difficult to determine how far it is a conſtant or very common ſymptom.

The colour of the ſkin changes often at the very beginning of the attack. The ſkin itſelf is colourleſs, or, in other words, white; the ſcarf ſkin is alſo colourleſs, but tranſparent. The blood flowing in the blood veſſels is ſcarlet, that is a mixture of red and yellow; in the arteries the yellow is more or leſs loſt in its paſſage through the capillary veſſels into the veins; but when the circulation is going on, it retains a ſmall portion of its yellow, even in the veins. On the whole, therefore, a colour is given to the exterior ſurface of the body, by the blood circulating in the ſmall arteries, capillaries, and ſmall veins, which verges from a pure red to a tint of yellow; ſo that the external ſurface of the body is what we call ſomewhat of a florid red, in as far as its colour depends upon the blood circulating in the ſkin, or perhaps even ſomewhat under it. Between the ſcarf ſkin and true ſkin, there are ſeveral membranes which are called together rete mucoſum, of which there is one which is of a lighter or deeper brown, which is a mixture of red with a leſs proportion of yellow and blue than conſtitutes white or grey. This mixture is not always the ſame in different men; ſometimes it is ſuch as to approach more to white, and ſometimes to approach more to grey, and this governs what is commonly called the complexion in men. Beſides this membrane there are numerous glands, which ſecrete a kind of oily matter of a dirty yellow, that is, a yellow ſomewhat contaminated by a mixture of red and blue. In the attack of fever, the colour of the ſkin itſelf is not altered, the tranſparency of the ſcarf ſkin is ſomewhat diminiſhed, the colour acquired from the blood is very much diminiſhed; the colour of the brown membrane and the ſebacious matter remain and predominate, and give a dirty look to the external ſurface, which is very conſpicuous.

At the ſame time another appearance takes place in the ſkin. By a common error in the human mind, it is apt to take up what firſt offers itſelf to us. It was long before it could be inculcated into rude nations, that the earth was not the centre about which the whole of the heavenly bodies revolved; ſo on conſidering the bodies of animals, finding that the muſcles, which are the principle agents in producing the motions of the body, conſiſted of fibres, it was ſuppoſed that a part, in order to be capable of contraction, muſt conſiſt of fibres; and as no fibres could be ſhown in the ſkin in the human body, it has been believed by many that the ſkin was perfectly inert, and incapable of contraction; while there is no man, who was not blinded by his mind being pre-occupied by ſuch prejudice, who has not daily evidence in looking at his own ſkin, of its being ſometimes contracted, and applied to the muſcles, and other parts under it, ſo as to preſs upon them with great tightneſs, and at other times looſe and eaſily moveable; ſometimes ſmooth, ſoft, and equal, at other times contracted in wrinkles. In the attack of fever, it is contracted in wrinkles, and applied cloſely to the muſcles, and other parts below.

In deſcribing the diminution of ſenſibility, that of the particular parts has been left to be conſidered along with the other alterations which take place in them.

The ſenſibility of the ſkin is very much diminiſhed in the attack of a fever. Of this one great inſtance is its inſenſibility to heat, which has been ſo great in ſome inſtances, as not to impreſs any ſenſation on the mind, when hot bodies have been ap- to it ſo as to coagulate the ſcarf ſkin, or even decompoſe the true ſkin, as has been obſerved.

This inſenſibility to heat is not from the ſenſation of coldneſs, which has been already deſcribed, for it extends to the ſenſations of the ſkin of every kind. It is a degree of what is called numbneſs, or indiſtinctneſs of the ideas which are obtained by the feel of the figures of bodies; of their ſmoothneſs, or roughneſs, their hardneſs, or ſoftneſs, &c. It is even extended to other applications that give pain as well as heat, as to pricking with ſharp inſtruments, the application of ſtimulating ſubſtances, &c. The degree in which this numbneſs, or want of ſenſibility in the ſkin takes place, is various, but exiſts almoſt always more or leſs in the attack of a ſimple fever, and among the firſt appearances in the diſeaſe.

The eye in its appearance is alſo very much changed. Often at the very beginning of a ſimple fever, the exterior ſkin of the eyelids is affected in the ſame manner as the ſkin in the other parts of the body. The interior ſurface is not readily expoſed to view; it is the exterior ſurface of the eye itſelf, and what can be ſeen through its tranſparent membranes which have been taken notice of. The exterior ſurface conſiſts of the tunica albuginia, and retina, covered by the tunica conjunctiva, which is in itſelf very thin, perfectly tranſparent, and colourleſs. The eye may be divided, as in common language, into the white and pupil of the eye. In the white, the tunica albuginia is in itſelf of a white colour with ſomewhat too great a mixture of blue; there run great numbers of blood-veſſels; many of theſe are viſible to the eye, many others may be ſeen if we apply any magnifying apparatus to the living eye; and we know from anatomical enquiries, that there are vaſt numbers too minute to be diſcovered by any means in the living eye. Theſe carry blood of a florid, red colour, which influence the general colour of the white of the eye. Beſides theſe, there are a number of glands which ſecrete either mucous, or ſebaceous matter. The ſebaceous matter is of a dirty yellow colour, like the colour of bile, and by many when predominant has been conſidered as actually bile; every thing in the body, however, which is of this particular yellow colour, is not bile; the wax in the ear, for inſtance, is not only of a yellow colour, but bitter in taſte, yet it is not bile, differing from it in moſt of its other properties eſſentially. In the attack of a ſimple fever, there are fewer blood-veſſels viſible to the eye; the florid red makes much leſs of the general colour, and leaves the colour more to be governed by the bluiſh white of the tunica albuginia, and browniſh yellow of the ſebaceous matter, ſo that the white part of the eye is more obſcure, or leſs brilliant than in health. The iris, as ſeen through the cornea, in the attack of a ſimple fever, is ſometimes more contracted, ſometimes more dilated than it is in the natural ſtate of the body, but almoſt always it is leſs ſuſceptible of contraction or dilation upon a larger or ſmaller quantity of light falling upon it; and the ſame want of diſpoſition to contraction and dilation ſeems to affect all the muſcles which govern the figure of the eye, for it is well known that the eye conſiſts of ſeveral lenſes which paint external objects upon the retina, but to form a diſtinct picture of diſtant and nearer objects, it is neceſſary that theſe lenſes ſhould be of different degrees of convexity, and there are muſcles adapted to give them greater or leſs degrees of convexity, as objects at a greater or leſs diſtance are looked at; the eye is accordingly conſtantly changing its figure as it looks at more diſtant or leſs diſtant objects. Theſe changes are very apparent, when the eye ſo changing itſelf is looked at, and the more particular the attention to any object, and the quicker this attention is executed, it is the more obſervable, and gives an idea of what is called acuteneſs in the eye. But on the attack of fever the muſcles are not ſo ready to give it this change of form, ſo that it appears dull, and as if the patient was not attending to any particular external object. Further, it would ſeem, that in order to obtain a true picture on the retina, it is neceſſary that the eye ſhould be directed to the object, and the quickneſs with which this direction takes place, alſo ſhows to the by-ſtander the attention of the mind to that object, and gives an idea of acuteneſs to the eye; but on the attack of ſimple fever, this quick change in the direction of the eye does not take place, and gives occaſion likewiſe to an appearance of ſtupidity in the eye, in the attack of a ſimple fever; but moreover, even when the eye is not directed, by the mind's attention to external objects, to change its figure and poſition, when the mind itſelf is occupied with ſtrong ideas brought up by the memory, the eye is apt to put itſelf in thoſe poſitions, both with regard to its figure, and direction, but eſpecially with regard to its figure, that it did when it received theſe diſtinct impreſſions; it often has an appearance of acuteneſs, as if it was actually adapting itſelf to receive theſe impreſſions, ; but this does not happen in the attack of a ſimple fever; whether the inaction of the muſcles depends upon their own depreſſion of powers, or on the mind's not exciting them, or both, can, perhaps, be hardly determined; but the whole degree of appearance of ſtupor is, perhaps, very improperly apt to be aſcribed to the mind, whoſe effuſions are rendered more ſenſible from the eye than any other organ of the body; and thoſe who have conſidered the mind as connected with the body by the brain only, have commonly conſidered this inactivity of the eye as dependant upon the brain.

The whole ſecretory veſſels throughout the body, ſecrete a ſmaller quantity of fluids. In the firſt place, the urine conſiſts naturally of water, in which is diſſolved a mucilage which is ſoluble in water heated to the heat of the human body; but not ſoluble in water of a leſs degree of heat; it, therefore, ſeparates when the heat is leſs than that of the human body. In health the urine is tranſparent when firſt evacuated; but upon ſtanding to cool, it be-becomes cloudy, or depoſits a ſediment. But in the attack of fever, this ſubſtance is no longer found, ſo that the urine continues tranſparent when it has ſtood to cool. Since in all countries where we have deſcriptions of fever, the air of the atmoſphere is colder than the human body, this difference has been always obſerved; but whether it would take place where the atmoſphere is of the ſame heat with that of the human body we do not know; certain it is that the urine in health is rendered again tranſparent by heating it to the heat of the body. It may be that the ſecretory veſſels of the kidneys are ſo contracted as not to let this ſubſtance paſs through; or it may be that it is not in the blood, but is formed in the kidneys in health, but not in fever. The quantity is ſo very ſmall, not above a grain in a pint, even when the appearance of it is great, that it is impoſſible to detect it in the blood in health, and, therefore, this queſtion cannot be determined; but the contraction of the ſecretory veſſels of the kidneys, during the attack of fever, is evident from the ſmall quantity at that time ſecreted, as well as from its ſometimes being of a paler colour. That the urinary bladder is alſo contracted in the attack of a ſimple fever is evident from the ſmall quantity of urine evacuated at a time; for if the bladder be much diſpoſed to contract when a ſmall quantity of urine gets into it, it is ſtimulated to expel it. There is a ſmaller quantity of fæculent matter evacuated from the inteſtines during the attack of a ſimple fever. The fæculent matter in the inteſtines conſiſts partly of that part of the food which is not digeſted; partly of the bile, and other fluids ſecreted into the inteſtines, which are not uſed during the digeſtion; or if they are

* is more active from want of absorption.

uſed and decompoſed, are not abſorbed into the blood veſſels. If a man has eat heartily before the attack of a fever, the food not being digeſted, in leſs than ſix or eight hours, it is either rejected by vomiting, or paſſes into the inteſtines, or remains in the ſtomach. Firſt, the ſtomach does not act upon it, ſo as to make it go through the digeſtion neceſſary in the ſtomach, or to throw it into the duodenum, but ſometimes it remains for ſeveral days in the ſtomach as the author has ſeen it rejected on employing an emetic, three, or even four days afterwards; but this cannot be the caſe in a a ſimple fever which does not continue four and twenty hours: ſecondly, if it paſſes into the inteſtines, from the inaction of the inteſtines, from their depreſſion of ſtrength, itdoes not undergo the changes neceſſary to convert it into chyle, and therefore muſt paſs forwards undigeſted; but the ſame inaction prevents the periſtaltic motion of the inteſtines from going on, ſo as to carry it or the excrementitious parts of the fluids ſecreted in the inteſtines forward to the rectum, ſo as to

from torpor of stomach

be evacuated. This is one cauſe of there being leſs evacuation during the attack of a ſimple fever. In the ſecond place, there is a leſs ſecretion of the fluids which flow into the inteſtines, and in conſequence leſs to be carried downwards, or to ſtimulate the inteſtines ſo as to encreaſe their periſtaltic motion; from both theſe cauſes coſtiveneſs takes place. There is one exception, however, which muſt here be made, that if ſuch nauſea ſhould take place as to produce vomiting, a much larger quantity of bile, pancreatic juice, gaſtric juice, &c. are often evacuated; but the author thinks theſe evacuations ſhould rather be attributed to the ſecond than to the firſt ſtage of the fever, as it never happens that a ſimple fever, or a paroxyſm of an intermittent, is fatal, if vomiting takes place. The dryneſs of the ſkin, of the tongue and mouth, and the want of ſufficient ſecretion in other parts, has already been noticed. If there be an ulcer in any part of the body, or a wound during the attack of a fever, it becomes dry, as the author has frequently obſerved, ſo that the veſſels which throw out fluids, even among the muſcles, are alſo apparently contracted.

The contractions of the heart, and in conſequence the pulſations of the arteries become more frequent in the attack of fever. It has already been obſerved, that the number of contractions of the left ventricle of the heart were very ſteady in adults in health, and very nearly 73 in a minute; it increaſes in the attack of a ſimple fever, but this increaſe is frequently not among the very firſt ſymptoms. The fever has ſometimes come on, and continued for half an hour before there is any increaſe of the number of contractions; ſometimes, however, greater frequency takes place along with the very firſt appearances; but this hardly ever happens without other ſymptoms of the fever being preſent at the ſame time. The frequency does not change all at once, but gradually from 73 to 74, 5, 6, and ſo on to 80, 90, as far as 100 at leaſt. In a ſimple fever, which terminates in 8, 10 or twelve hours, it is rarely leſs than 100, and ſometimes in the courſe of the diſeaſe riſes to 130 or 140. In a ſimple a ſimple fever, the frequency of the contractions is generally greater than it is in compound fevers, which is remarked at preſent, becauſe practitioners being much more accuſtomed to ſee compound than ſimple fevers, may be apt to be impreſſed with the idea that too great a number of pulſations is aſcribed to ſimple fever, the number which takes place in a continued compound fever being generally about 100 in a minute. But the varieties which happen in compound fevers are not, however, at preſent to be diſcuſſed.

It has already been obſerved, that greater frequency of the contractions of the heart was not in appearance abſolutely neceſſary to conſtitute fever; accordingly, as it has juſt been obſerved, the fever may have come on ſome time before the frequency takes place. It is not certain, even that a ſimple fever may not prove fatal before the contractions become more frequent. Certain it is however that if a ſimple fever, or a paroxyſm of an intermittent fever be fatal in the attack, the contractions moſt commonly become very frequent, even beyond what can be counted. This frequency of the contractions of the ventricle of the heart is certainly a part of the attack of the diſeaſe: when the frequency has once taken place, it never goes off again in a ſimple fever until the whole fever has gone off: it is otherwiſe in compound fevers not very uncommonly.

The number of the pulſations of the arteries depends almoſt always upon the number of the contractions of the ventricle of the heart, juſt as the number of contractions of the ventricle depend on the number of contractions of the auricle; for when the auricle contracts, it throws blood into the ventricle which diſtends it, and ſtimulates it to contract. So when the ventricle propels blood into the arteries, it diſtends them, and ſtimulates them to contract. The number of pulſations of the arteries, therefore, muſt depend in general upon the number of contractions of the ventricle. If they acted, not by a muſcular power, but by their elaſticity, this muſt always happen. But that the arteries act by a muſcular power, has been ſufficiently proved by experiments and obſervations foreign to the preſent purpoſe. It may happen then, that an artery may contract by another ſtimulus, beſides the diſtention produced by the blood thrown into it by the ventricle, and the number of pulſations of the artery, therefore be greater than the number of contractions of the ventricle, or the diſtention of the blood thrown in from the ventricle may not be ſufficient to ſtimulate the artery to contract. Hence it happens, although very rarely, that the number of pulſations of the artery does not accord with the number of contractions of the ventricle.

From the contraction of the arteries being a muſcular action, ariſe other varieties in the feel of the pulſations of the arteries, independant of their number; for the arteries may not allow themſelves to be dilated to ſo great a degree by the force with which the blood is thrown into them by the ventricle. In this caſe, the artery, although it be the ſame with regard to its elaſticity, will feel larger or ſmaller in the attack of fever. It feels generally ſmaller. This ſmallneſs may, however, ariſe likewiſe from another cauſe; for the ventricle of the heart may be contracted at a time that the blood is thrown into it from the auricle, ſo as to receive blood in ſmaller quantity, and throw it out in ſmaller quantity, and in conſequence diſtend the artery leſs, or it may contract more feebly, and ſo diſtend the artery leſs; or, as has been ſaid, the artery itſelf may reſiſt the dilatation, and it would ſeem that all theſe things contribute to the arteries feeling ſmaller in the pulſation at the beginning of the attack. It is to be obſerved, that in thoſe attacks of fever, which are fatal, the artery continues to feel very ſmall, and feels ſmaller and ſmaller till the patient ſinks. This ſmallneſs of the feel of the artery goes off very ſoon in general; but that will be conſidered afterwards when we come to conſider what happens after the the attack of the ſimple fever.

As has been ſaid, if an artery only acted by its elaſticity there would be no difference in its pulſations, excepting thoſe which aroſe from the different numbers of contractions of the left ventricle of the heart, the quantity of blood thrown into it at each contraction of this ventricle, and the force and regularity with which the ventricle contracted: but many other ſenſations are given by the pulſations of the artery. Theſe other ſenſations, indeed all the ſenſations ariſing from the pulſe that cannot be meaſured by any mechanical inſtrument, as the frequency can be by a watch, but which we may judge of from the ſenſation itſelf, require practice in order to make the diſtinctions, although they ſhould not be very nice, as it requires a practical eye to make diſtinctions in painting, and a practiſed ear in muſic. As, therefore, there muſt be ſomething arbitrary in determining the different ſenſations given by the pulſation of the arteries; they have been repreſented very differently by different practitioners, ſome making them very numerous, others very few. There is, however, one ſenſation which is very generally allowed, that of hardneſs, which ſeems to the author to be in the beginning of the contractions of the artery, and to be ſomewhat ſimilar to the thrill of a large muſical chord vibrating. Others have deſcribed it differently. This ſtate of the arteries producing this ſenſation gives a particular diſpoſition to the blood.

The blood conſiſts eſſentially of three parts, the red particles coagulable, lymph, and ſerum. Of theſe the coagulable lymph, when extravaſated, coagulates, and gives ſolidity apparently to the whole maſs of blood. After the whole maſs of blood is apparently become ſolid, there oozes out from every part of it a fluid, conſiſting of the ſerum, the water that was contained in the coagulable lymph, and extraneous matters that are fluid or ſoluble in water. A ſolid maſs ſwims in the middle, conſiſting of the mucilage of the coagulable lymph, and the red particles.

If blood be let flow from a blood-veſſel into a baſon, ſometimes the coagulable lymph coagulates almoſt inſtantly. In this caſe, the red particles and coagulable lymph are blended very perfectly together, ſo that the coagulum appears an uniform maſs. But if the coagulable lymph, or as is commonly ſaid, the blood does not coagulate inſtantaneouſly, but continues fluid for ſeveral minutes, the red particles fall down from the ſurface, ſo that the blood divides before it coagulates, the upper part of it being a fluid without any red colour in it, but tranſparent and yellowiſh, and the lower part forms a red fluid. When the blood coagulates ſlowly, there is an upper cruſt, therefore, which has no red particles in it, and the lower part is a red ſolid, and when the ſerum oozes out, the coagulum has the appearance of being covered on the ſurface with a bluiſh or yellowiſh membrane.

The ſtate of the arteries which gives their pulſations the feel of hardneſs, gives the blood a diſpoſition to remain fluid for ſeveral minutes after it flows from the bloodveſſels into a baſon. That this is the caſe is proved by attending to the beginning of a pleuriſy, acute rheumatiſm, or any other diſeaſe in which the pulſe becomes hard ſoon after the beginning of the diſeaſe. If, juſt before the pulſe becomes hard, a vein be opened, and the blood be received into a baſon, it coagulates immediately, and no cruſt is found on the ſurface of the coagulum; but if the pulſe remains hard for an hour or two, and then a vein be opened, the blood will remain for ſeveral minutes fluid after it is received into the baſon. It is, therefore, the ſtate of the arteries, when their contractions give the ſenſation of hardneſs, that occaſions the alteration in the ſtate of the blood. If a vein be opened and blood be let flow from it ſucceſſively into three different baſons, and theſe be let ſtand until the coagulation, and extrication of the ſerum takes place, it happens frequently that the cruſt, which has been deſcribed, appears in the firſt baſon, and not in the ſecond or third; or it appears in the ſecond, and not in the firſt or third; or it appears in the third, and not in the firſt or ſecond; or it appears in any two of them, and not in the third. It may be, and has been ſaid, therefore, that this appearance can ſhow nothing, but is entirely vague. It has been ſaid above, that the appearance of this cruſt on the top of the coagulum is owing entirely to the blood's remaining longer fluid after it is received into the baſon, and ſo giving time to the red particles from their gravity to ſubſide from the top. There are circumſtances in the figure of the veſſel in which the blood is received in the manner and velocity in which it flows from the blood-veſſel into the baſon, which makes it ſometimes become ſolid ſooner or later, which is the occaſion of this variety; but if the baſons be of the ſame ſize and ſhape, and the blood flows into them from the blood-veſſel with the ſame circumſtances exactly, and the ſame velocity, ſuch variety is never found. It would be too great a digreſſion to deſcribe theſe circumſtances at preſent; it is only to be obſerved, that when there is a ſtrong ſenſation of hardneſs, the diſpoſition the blood acquires from thence of remaing longer fluid after its extravaſation is ſo ſtrong as to overcome theſe accidental cauſes of variety, and a cruſt is always found upon the coagulum. But when the ſtate of the arteries which gives the ſenſation of hardneſs is not ſtrong, then theſe external circumſtances frequently overcome the diſpoſition of the blood to remain longer fluid, and give the appearance of a cruſt on the ſurface of the coagulum.

The ſtate of the arteries in the attack of a ſimple fever is ſuch as to give a peculiar ſenſation to the finger during their contraction. The greateſt part of authors and practitioners have called this ſenſation hardneſs; it, therefore, undoubtedly approaches near, or actually is the ſenſation of hardneſs; but it muſt be obſerved, that where there is this ſenſation ſtrongly impreſſed upon the finger by the pulſation of the arteries in a ſimple fever, and blood is taken from a blood-veſſel, and received into a baſon, under all the circumſtances moſt conducive to keep it long fluid before it coagulates, it nevertheleſs coagulates ſoon, and no cruſt is found upon its ſurface. This being the caſe, it is clear that it is greatly to be ſuſpected that the ſtate of the arteries, which gives this ſenſation to the finger, is not that ſtate which gives this ſenſation of hardneſs, and the author thinks that he can determine the difference between theſe ſenſations perfectly.

There is, therefore, another kind of ſenſation which takes place, if the finger be applied over an artery in a fever, to which the author gives the name of obſtruction, he not meaning to impreſs any idea with regard to the ſtate of any part of the body, but merely as a name to diſtinguiſh it from hardneſs. This ſtate of the arteries giving this feel of obſtruction, is conſtant in the attack of ſimple fever, and remains at leaſt till the fever begins to go off. By what has been ſaid, it is not meant by any means to ſay that hardneſs of the pulſe does not happen frequently in fever, but it does not happen immediately on the attack. When hardneſs of the pulſe takes place, it is a ſymptom produced in a ſtage of the diſeaſe, which is to be taken notice of afterwards: but hardneſs and obſtruction are ſo little the ſame, that obſtruction and ſoftneſs are not at all incompatible; the more violent the attack, the greater the feel of obſtruction.

When the attack of a ſimple fever is very violent, the pulſe is not only frequent, ſmall, and obſtructed, but the heart and arteries are otherwiſe deranged in their action. Generally, as has been ſaid, the times which the contractions take up are equal, but when the attack is very violent, they are ſometimes unequal, and ſometimes the time of a contraction is loſt, then we ſay that it intermits. This inequality of the action of the heart produces an inequality in the action of the arteries, whoſe pulſations become unequal and intermitent in fever ſimple or compound, or in any ſtage of it; this is always a very dangerous ſymptom, excepting where it alſo took place when the patient was in health, and before the diſeaſe aroſe, but in the attack it is particularly hazardous.

When theſe things have taken place, and often at the very firſt appearance of the diſeaſe, pain ariſes in the head. Pains ariſe in the head in fever from different cauſes, and in different manners, but that which forms part of the attack is that which is be treated of.

Many authors have deſcribed this pain as depending on the ſtate of the brain; but in the author's opinion erroneouſly: its ſeat is moſt commonly in the forehead over the eyes, and feels to the patient as external; ſometimes it likewiſe occupies the back part of the head, with an equal external ſenſation; ſometimes it feels to the patient all round the head. It is a conſtant pain, inaſmuch as it does not go off entirely, but varies ſometimes in degree, although it gradually encreaſes, for the moſt part, as the attack goes on. It is not accompanied with any external appearance.

Moſt uneaſy ſenſations are called pain; they differ from one another, ſome being acute and pungent, ſome diſtenſive, &c. But this is an uneaſineſs or pain which is accompanied with a ſenſe of weight, and though often extremely violent, yet not acute, diſtenſive, or ſore, but reſembling pain which ariſes from ſpaſmodic contraction. It is encreaſed often very conſiderably by light falling upon the eyes. The ſame kind of pain takes place in hyſteric affection, and other diſeaſes. A kind of ſimilar pain or uneaſineſs ariſes all over the body, which a patient often deſcribes a pain in all his bones, not being able to particularize in what part of the body it is felt.

This pain affects the extremities. It differs from that ſoreneſs which takes place in the ſecond ſtage of the diſeaſe, although it likewiſe continues often during the ſecond ſtage, and goes all through compound fevers when their paroxyſms run into one another. It occaſions a great reſtleſſneſs and uneaſineſs.

Delirium is a ſymptom which ariſes frequently in fever. Some have conſidered delirium as a diſeaſe of one ſpecies only; but the author thinks he can diſtinguiſh ſeveral different ſpecies which appear not to depend upon the ſame cauſe. Delirium is a derangement in the ſenſibility of the organs of ſenſation, and a derangement of the powers of the mind, and not uncommonly of the functions of the body. In its ſlighteſt degree, the ſleep is attended with numerous and diſtreſſing dreams, which renders it unrefreſhing. The patient, when he juſt wakes, is ſome time before he can attend to the impreſſions made on the organs of ſenſation. He does not know at firſt his bed, his bed-chamber, or his attendants for ſome minutes, but ſeems to awake, as it were, a ſecond time, and becomes perfectly ſenſible. In a little greater degree the imagination is diſturbed, and ideas float in the mind without train or connection, and rapidly; unleſs his attention be ſtrongly excited to ſome one object, he does not attend to the impreſſions made by the organs of the ſenſes, but rather takes his ideas from memory than from the objects around him. If his attention, however, be excited, he is capable of diſtinguiſhing the ſurrounding objects perfectly. As the delirium encreaſes, the faculty of diſtinguiſhing the objects that are around him gradually diminiſhes; he begins to talk incoherently; a number of diſagreeable ideas run now rapidly through his mind without any kind of connection. He is ſometimes in a church-yard, ſometimes falling from a precipice, ſometimes wandering in an unknown

known country, ſometimes purſued by wild beaſts, &c. An immenſe number of ſuch ideas keep hovering in his mind; the diſeaſe ſtill encreaſes; he becomes perfectly inſenſible to external objects; the evacuations take place involuntarily, and without conſciouſneſs; he has an uneaſy feel in the ſkin, and in conſequence picks the hairs, or rather attempts to pick the hairs from his bedcloaths; he ſees a number of blackiſh ſpots flying in the air, which he attempts to catch: even in this ſtate the patient may recover. But when it comes to its greateſt pitch, the ſwallowing and breathing come to be affected; when this is the caſe, he is almoſt always cut off. Theſe appearances take place in all kinds of delirium, and that which takes place as a ſymptom of the firſt ſtage of fever, in a ſimple fever, is attended only by theſe appearances.

With theſe ſymptoms, a ſenſe of weight, fullneſs and uneaſineſs takes place in the breaſt, ſometimes tumour and hardneſs about the pit of the ſtomach. This anxiety and reſtleſſneſs is totally different and independent of that univerſal reſtleſſneſs which takes place all over the body, already deſcribed; they are frequently in very different proportions to one another, the feel of the one is very diſſimilar to the ſenſation which the other excites. It is that kind of anxiety and reſtleſſneſs which ariſes in grief, fear, and other paſſions of the mind, which is, at the ſame time, attended with paleneſs, and diminution of ſize of the veins, which are ſeen ſuperficially. It would, therefore, be ſuſpected to take place from more blood in the large veins preſſing on the heart than could well paſs through the lungs. In thoſe diſſections which have been made of patients who have died in the attack of a ſimple fever, the large veins going to the heart, that is the vena cava both ſuperior and inferior, the right auricle of the heart, the veins of the lungs have been found diſtended with blood to a much greater degree than they are commonly, when death takes place from other cauſes.

Sometimes difficulty of breathing alſo takes place, and cough; but this is by no means conſtant.

While theſe derangements take place in the other parts of the body, the ſtomach has particular affections in itſelf, independent of thoſe which it has in common with the other parts of the ſyſtem. Beſides the ſenſations of taſte, ſmell, hearing, and feeling, there are others which do not depend upon, nor are received from the mouth, noſtrils, eyes, ears, or ſkin.

No language has ever yet become ſo copious as to expreſs the varieties in the ſenſes. Thoſe ſenſations which we receive from other parts of the body than what are commonly called the organs of the ſenſes, are expreſſed by the term we apply to the ſenſation received by the ſkin. We ſay, for example, that we feel hunger and thirſt. Although we ſay that we feel pain, yet the idea held generally, is not that pain is particularly attached to the ſkin, or other organs of the ſenſes, but that it is in various parts of the body. Hunger is commonly referred to the ſtomach. It does not ſeem, however, that it is always clearly an affection of the ſtomach. When the blood-veſſels have been greatly emptied, either by encreaſed ſecretions, or blood flowing immediately from the blood-veſſels; by want of ſufficient nouriſhment in health; by want of nouriſhment or waſting of the fluids during the progreſs of a diſeaſe: if the perſon ſhould come into perfect health, and only remain weak, the appetite is generally very great, and even beyond the powers of digeſtion. The hunger, therefore, in this caſe ſeems rather to be an affection of the blood-veſſels, a deſire to fill themſelves, than any particular affection of the ſtomach itſelf. On the contrary, when the veſſels are very full, there is often no appetite, although the ſtomach is not in the leaſt incapable of digeſting a large quantity of food if thrown into it, without inconvenience. Although hunger, therefore, or want of it, is generally referred to the ſtomach, it may be doubted, in ſome degree, if it be an affection of the ſtomach at all times. It is not meant to be ſaid by any means, that hunger can take place when the ſtomach is diſeaſed, excepting in that diſeaſe, the principal ſymptom of which has been conſidered as conſiſting in a voracious appetite.

In the attack of fever, the ſenſation of hunger not only does not take place, but if it was ſtrong, the moment the attack begins, it ceaſes. The author has known ſeveral inſtances, where perſons ſitting down to table with a ſtrong appetite; an attack of fever ſuddenly taking place; in leſs than two minutes have been unable to eat any thing, and have been ſeized with perfect averſion even to the ſmell of food. This averſion to the ſmell, or to the ſight of food, or its even being mentioned, is often very ſtrong during the attack of fever. What happens with regard to this in the other ſtages of ſimple fevers, and during the continuance of compound fevers, will be taken notice of afterwards.

Nauſea likewiſe happens often at the firſt attack, and this is encreaſed to ſuch a degree, as to occaſion vomiting. Commonly vomiting does not take place at the very beginning of the attack; but the diſinclination to food encreaſes gradually to nauſea, then to vomiting, which in ſome caſes is very ſevere, not only the contents of the ſtomach being evacuated, but likewiſe thoſe of the duodenum, and of the glands, the ſecretory ducts of which open into it; the principal of theſe are the ductus communis choledochus, and the duct of the pancreas. Bile, therefore, and the pancreatic juice are thrown up together, with the contents of the ſtomach, and the other fluids ſecreted into the ſtomach and duodenum. Of all theſe fluids bile is the moſt conſpicuous from its colour, taſte, and ſmell. This has often been obſerved by practitioners, while the gaſtric and pancreatic juices, and other juices ſecreted into the duodenum, as they are not very conſpicuous from their ſenſible qualities, have not been taken into the account. It has often been ſuppoſed that the redundancy of bile conſtituted an eſſential part of the attack of fever; whereas it is mere accident. If the pancreatic juice had been blue, and had any particular taſte or ſmell, and the bile had been colourleſs, inſipid,

ſipid, inodorous, or as much ſo as the pancreatic juice is, in that caſe, whatever has been ſaid of the redundancy of bile as an eſſential part of the attack of fever, would have been ſaid of the pancreatic juice. It is clear that no experiment hitherto made public has ſhown that any bile was ever contained in the blood veſſels, excepting in caſe of jaundice, and that, therefore, there can be no redundancy of bile, excepting as much as can be contained in the biliary ducts, and gall bladder. Much more than this is thrown out by twenty times in the attack of a ſimple fever in half an hour. Therefore, the bile thrown out is a conſequence of the ſickneſs, exactly in the ſame manner as it is a conſequence of the ſickneſs ariſing from the agitation in a ſhip at ſea, and is not at all to be taken farther than as a mere accident in the attack of fever. The loſs of appetite encreaſes, and the nauſea and vomiting takes place ſo inſtantly at the beginning of fever, that they can hardly be conceived otherwiſe than as an affection of the ſtomach itſelf.

Thirſt we alſo expreſs by the term, feeling; it is commonly referred to the mouth. Certainly, when the glands of the mouth do not ſecrete a ſufficient quantity of fluid to keep the membranes moiſt, this ſenſation ariſes. Although the glands of the mouth may ſecrete their ordinary quantity of fluids, yet, nevertheleſs, a greater quantity of air paſſing backwards and forwards to the lungs, through the mouth, in ſpeaking and breathing, ſo as to dry the membrane, excites this ſenſation. But thirſt may ariſe the when membrane of the mouth remains perfectly moiſt.

When the membranes of the mouth are perfectly moiſt, if a large quantity of watery fluids ſhould be evaporated in the form of inſenſible perſpiration, or exude from the ſkin in ſweat, or be otherwiſe thrown out by any of the excretory organs which commonly throw off watery fluids (as, for inſtance, in diabetes) great thirſt enſues, although there does not appear to be any particular affection of the mouth. We cannot ſay, therefore, that an affection of the mouth is the cauſe of the thirſt, becauſe the ſenſation may be as well produced by a ſimple want of water in a ſufficient proportion in the blood-veſſels; and thirſt, from this cauſe, commonly produces a deſire to drink whether the mouth is diſordered or not. At the time of an attack of fever, the mouth may ſometimes be moiſt, thirſt, nevertheleſs, uſually takes place. It frequently happens that attacks of fever come on when there is no reaſon to believe that the proportion of water in the fluids has been diminiſhed, or is leſs than in the ordinary healthy ſtate of the body; it may, therefore, proceed from affection of the ſtomach, for that this is capable of exciting thirſt appears evidently, from that thirſt, which often ariſes from ſalted food thrown into the ſtomach, while it certainly ſtill remains there, or during the digeſtion of food uſed in too great quantity, or of difficult digeſtion. It would, therefore, appear that the loſs of appetite, averſion to food, nauſea, vomiting, and thirſt ariſing in the attack of fever, indicate that the ſtomach is particularly affected.

This might be ſuppoſed to be owing to the depreſſion of its powers. The powers of the ſtomach may not be ſufficiently great to digeſt a great quantity of food, yet the appetite may not be loſt, as is often ſeen in convaleſcence from fever; where it frequently is great, although the powers of digeſtion are weak. Thirſt can by no means be attributed to depreſſion of the digeſtive powers of the ſtomach. It may, therefore, be concluded, that there is alſo a peculiar affection of the ſtomach in the attack of fever.

Fever in its appearances as have been enumerated, ſhows in its attack; depreſſion of the powers of the mind; of the ſenſibility of the organs of ſenſation; of the exertion, and diſpoſition to be ſtimulated in the body; contraction in the veſſels throughout the ſyſtem, which being either confined to, or greater in the ſmaller veſſels, occaſions a larger quantity of blood to be accumulated in the larger veſſels near the heart; together with ſome peculiar affection of the ſtomach. Theſe external appearances in this diſeaſe, ſeem ſo very independent upon one another, excepting the quantity of blood accumulated in the larger veſſels in conſequence of the greater contraction of the ſmall ones, that they can only be conſidered as ſome alteration of the ſyſtem which has not hitherto been inveſtigated, therefore, every thing that has been ſaid relating to the eſſence of this diſeaſe has only been conjecture following wild conjecture, to which the author does not mean to add.

The fluids were totally unknown in their properties to the Greek and Roman phyſicians; every thing which they grounded upon their properties, or the properties of the ſolids, ſuch as redundancy of bile, phlegm, blood, black bile, heat, and cold, moiſture or dryneſs, was merely the phantom of their brain. Not but that their attention and accuracy in the hiſtory of the diſeaſe was extremely great. It is but very lately, and partly owing to the author's experiments, that the blood was known to conſiſt of red particles inſoluble in ſolutions of the neutral ſalts contained in the other parts of the blood; coagulable lymph, a fluid coagulated on extravaſation, which was diſcovered by Senac; ſerum, a fluid not coagulable on extravaſation, but coagulable by heat, diſcovered by a ſtudent in anatomy, ſomething more than two centuries ago; a ſolution of natron muriatum, ammonia muriata, and ammonia phoſphorata, ſometimes calx vitriolata, and calx muriata, a ſolution of putreſcent mucilage, likewiſe water diffuſed through the other parts.

An attack of fever takes place when theſe parts of the blood are in various proportion to each other, as has been aſcertained by experiment.

The red particles differ in their colour; in being perfect, or broken down into ſmaller or irregular ſhaped maſſes, which but rarely happens. The attack of fever takes place in any of theſe caſes. The coagulable lymph ſometimes coagulates immediately on being taken from a blood-veſſel, ſometimes it remains fluid for a few minutes, ſo as to allow the red particles to fall to the bottom before it coagulates. It ſometimes coagulates more firmly, ſometimes more looſely; the ſerum ſometimes ſeparates more completely from the maſs than at other times. Heat coagulates it ſometimes more, ſometimes leſs readily and firmly. In all theſe caſes attacks of fever take place. There is, therefore, no ſenſible ſtate of the fluids contained in the blood-veſſels peculiar to it.

An imaginary being, ſuch as the ſpiritus archeus of Van Helmont, or as imaginary an obſtruction, ſuch as that of Paracelſus and Boerhaave, cannot be taken as a ground on which to found the phænomena or the practice in fever.

Although contraction of the ſmall veſſels is a part of the external appearance which takes place, converting the Latin word contraction into the Greek word ſpaſm, does not make it the eſſential part in fever. This term has been applied ſo variouſly that it gives no ſtrict or defined idea. There are certain parts of the body which are capable of becoming ſhorter in one direction, inde-

pendent

pendant of their chemical or mechanical properties; this ſhortening has been called contraction, it is produced by ideas of the mind, volition, or ſtimuli applied. When there is no appearance of any idea of the mind, volition, or the application of a ſtimulus, the moving part ſometimes contracts; this contraction has been called ſpaſm. It has happened when a moving part contracts in conſequence of an idea of the mind, volition, or the application of a ſtimulus, that the contraction continues long after theſe cauſes ceaſe to act; when it continues longer than the uſual time it has been called ſpaſm.

When any veſſel has its ſides ſhortened in the direction round the veſſel, its diameter of courſe becomes leſs, and the veſſel is ſaid to contract. All the moving parts are contracted to a greater degree in a living body than they would be, were the body dead. This has been called the tone of the parts. This contraction is conſtant, but not always the ſame in degree. It is often greater or leſs without any alteration in the health. The blood-veſſels are conſtantly preſſing upon the blood in their endeavour to become ſmaller, which they are prevented from doing by the blood contained in them. That this is the caſe is evident, for if any opening is made in a blood-veſſel, blood is thrown out. It may be ſaid, that the power which forces it out is that of the circulation, but the preſſure of the ſides of the blood-veſſels muſt be equal to the force of the circulation, otherwiſe they would be diſtended, and enlarged to a greater degree, as action and reaction are equal and contrary. If the action of the powers producing the circulation be weaker, the blood-veſſels, if every other circumſtance be the ſame, will be ſmaller in their diameter; or, ſuppoſing the force of circulation in a blood-veſſel ſhould be the ſame, if the tone of the veſſel ſhould encreaſe, the veſſel will contract, and become ſmaller in its diameter; but applications may be made to a part, in which the force of the powers of circulation continuing the ſame, and the tone the ſame, contraction in the veſſels may take place in conſequence of that application; as when we apply aſtringents, for example, which act without affecting the chemical or mechanical properties of the part.

When the blood-veſſels of a part, in conſequence of any ſuch cauſe, contract, and the cauſe is removed, it ſometimes happens that the contraction goes off, ſometimes continues. A man ſitting in a warm room ſhall have the blood-veſſels of his hand of a conſiderable ſize; if he puts his hand out of the window into the cold air, its blood-veſſels will contract; returning it into a warm air, they ſhall ſometimes be enlarged again in a very ſhort time, ſometimes they ſhall continue contracted after this cauſe of contraction is removed: this has been called by ſome ſpaſm. If the blood-veſſels ſhould contract apparently without any cauſe, the force of the circulation, and their tone remaining the ſame; it bears an analogy to the contraction happening in like manner in the muſcles, without any apparent cauſe; and is alſo called ſpaſm. As no effect, however, can take place without a cauſe, ſuch contraction muſt ariſe from ſome cauſe, although it be not apparent. Again, there is a certain degree of regularity which takes place in the contractions of the various moving parts, if it does not, the irregularity has frequently been called ſpaſm. For example, in the periſtaltic motion of the inteſtines, there is a regular motion takes place ſpirally downwards. If two rings ſhould remain contracted ſome time, ſo as a vapour is confined between them; or if one ring ſhould contract ſtrongly, and preſs the interior part, ſo as to give pain; if either of theſe irregularities ſhould take place, it is called ſpaſm. Pains ariſing in any part of the body not referred to any apparent cauſe, as hemicrania, have been called ſpaſm. The term has alſo been applied in a variety of other ways. Now the contraction which takes place at leaſt in the ſmall veſſels, the appearances of which have been pointed out, if it can be called ſpaſm, is of that kind where the veſſels contract for ſome cauſe, and remain contracted after the cauſe is removed. But all the cauſes of fever do not apparently produce contraction, and contraction is by no means the only appearance that takes place in fever, and the other appearances are totally unconnected with it, as far as can be judged. It is, therefore, much more probable that this contraction is not the eſſential part of fever, but is produced by the fever, continues as long as the fever which is its cauſe, and goes off when it is removed.

Others have taken the term ſpaſm much more generally than in any one of theſe ſenſes. That every preternatural motion, or affection of the ſyſtem, which aroſe without any alteration in the chemical properties of the ſolids or fluids, or any introduction of extraneous matter into the ſyſtem was ſpaſm, under this definition, it would not, perhaps, be difficult to admit that fever was ſpaſm, but for any purpoſe of underſtanding the hiſtory or manner of treatment of the diſeaſe, this would be uſeleſs.

Converting the Latin word contraction into the Greek word ſpaſm, will not make the depreſſion of the powers of the mind; of the ſenſation; of the exertion of the powers of the body; or of the diminution of the ſuſceptibility of being affected by external applications in the body, ſo as to excite motion, or produce reſt dependent upon the contraction; nor will it make the peculiar affection of the ſtomach dependent on it.

What, therefore, is the real derangement in the ſyſtem which produces the external appearances in fever, it muſt be owned, is not at all known; therefore, without attempting to make conjectures, we are to purſue the hiſtory of the diſeaſe as it manifeſts itſelf by external appearances.

The ſymptoms of the attack of fever which have been enumerated, however much they may be varied in degree or proportion, continue through the whole diſeaſe. The more numerous and violent they are, ſo is the fever itſelf more violent; when they are all gone off, the fever no longer exiſts.

Fever then is a diſeaſe, the eſſence of which is not underſtood. It manifeſts itſelf by a depreſſion of the powers of ſenſation, irritability, and action in the body; and likewiſe of the power of memory, imagination and judgment in the mind; with contraction of the ſmall veſſels throughout the body; an accumulation of fluids in the large veſſels; and ſome particular affection of the ſtomach.

It may be a queſtion, whether it be beſt to proceed to the deſcription of the ſubſequent ſtages of the diſeaſe, or inveſtigate the cauſes which produce it. The ſubſequent ſtages depend entirely upon the attack, and if the fever goes off, ceaſe. Although theſe ſubſequent ſtages require much attention in the courſe of the diſeaſe; they are nevertheleſs no part of its eſſence.

The cauſes of diſeaſes have very frequently been taken from hypotheſis. It is not the author's intention to enter into metaphyſical reaſoning, yet preciſion of ideas has been ſo little attended to in medicine, where it is more neceſſary than in any other ſcience or art, that he may be allowed to make the following obſervations. The mind can form an idea that an effect can take place without any cauſe; that, for inſtance, the Almighty exiſted from all eternity, with all his powers, without any cauſe. It is from experience alone the doctrine ſprings that effects have cauſes. We find when the beams of the ſun touch the atmoſphere in any particular part of the earth, day-light begins to appear, that the light continues to encreaſe until they fall upon the earth in a perpendicular direction; that as the ſun deſcends the light diminiſhes, and when his beams no longer touch any part of the atmoſphere in that part of the earth, day-light totally diſappears. Of this we have conſtant and daily experience, therefore we are led to believe that rays coming from the ſun, whatever they may be, are the cauſe of day-light. In this caſe, the reference of effect to cauſe depends entirely upon experience.

In treating of fever, nothing is to be admitted of as a cauſe, the knowledge of the action of which does not depend upon experiment. Our experience of cauſe producing effect reſts entirely on one event happening, and another ſucceeding. It is no ſingle event following another which can eſtabliſh that the preceeding one is the cauſe of the other. If a noiſe produced by firing a muſket ſhould be heard, and immediately afterwards a man ſhould fall down dead, it might ſtrike the mind with an idea that the noiſe of the muſket was the cauſe of the man's death. Still it ought to be conſidered as in the very ſlighteſt degree of probability, that this was the cauſe of his death, which might have happened in conſequence of apoplexy. It is only from finding men dead frequently after the report of muſketry, that muſketry can be conſidered as the cauſe of death. If the report of many muſkets was heard, and a number of men were found dead upon the ſpot from whence the noiſe ſeemed to proceed, we ſhould immediately conclude that they had been killed by the muſkets; but although this had a conſiderable degree of probability, it might be erroneous, for the muſketry might have fired at a review without ball, and the men might have been paſſing over a piece of ground where a large quantity of gas was riſing up, without attending to their danger until they were ſuffocated. In the preſent inſtance, another very material circumſtance muſt be adverted to; it often happens that two concomitant effects take place from the ſame cauſe; the noiſe of the gun, and the death of the man are both the effects of the diſcharge of the gun, but it is not the noiſe which is the cauſe of death. It may be ſuppoſed, that a perſon may never have ſeen a gun fired, but may frequently have heard the noiſe occaſioned by it, and have ſeen a man drop down immediately afterwards; his experience will have led him to believe that the noiſe killed the man, and have reached this perſon with an effect that did not fall upon himſelf, ſince he remained unhurt. It requires, therefore, an extreme great caution in aſſigning an effect to a cauſe, not to be deceived; firſt, in believing that one thing happening before another that followed, the antecedent was always the cauſe of the conſequent; becauſe the precedent may be accident, or they may both be concomitant effects. It may be thought ſuperfluous to have made theſe remarks, but it muſt be conſidered that the author is not writing for metaphyſicians, but for practitioners in medicine, not one in a thouſand of whom ever thought of paying the leaſt attention to the operations of the human mind. Of the number of cauſes to which fever has been aſcribed by the practitioners who have treated of fevers, few will bear the teſt of any ſtrict enquiry. It is not worth entering into any refutation of many of theſe, but it is better to take a view of thoſe cauſes which are moſt ſtrongly marked.

The firſt to be noticed is infection. Fever has frequently taken place in a man who came near a perſon afflicted with the diſeaſe, although he has not touched him. It is very poſſible that this perſon ſo taken ill of fever after he had been near a perſon ill of fever, might, from ſome other cauſe, have been ſeized with the diſeaſe. For example, he might have been inoculated for the ſmall-pox ſome time before, and the fever which took place might have been in conſequence of that inoculation; but by repeated experience it is now known, that although it very frequently happens that a man coming near another afflicted with fever, is not afterwards affected with the diſeaſe, yet it is well eſtabliſhed, that of any number of men, one half of whom go near a perſon ill of this diſeaſe, and the other half do not go near any one ſo diſeaſed, a greater number of the former will be affected with fever than of the latter, in a ſhort period afterwards. In ſome inſtances the proportion is not very different, in others, the author has known ſeven out of nine who went near a perſon afflicted with fever, ſeized with the diſeaſe in the ſpace of three weeks afterwards. There is, therefore, a perfect ground from experience for believing, that coming near a perſon afflicted with fever is a cauſe of the diſeaſe.

The mind ſearches farther in this caſe: it will not be ſatisfied that the mere vicinity of a man afflicted with fever can be the cauſe of the diſeaſe, becauſe it has no experience of vicinity having any effect excepting by attraction, and repulſion. The univerſal belief, therefore, has been, that there is ſome matter riſing from the body when afflicted with fever, which, being applied to the body of another, gives occaſion to the diſeaſe in him.

If it be any ſuch matter, it is perfectly incapable of being diſcovered by any of the organs of the ſenſes. Where a man is afflicted with the moſt infectious fever, if he be in a clean room, with clean bed-cloaths, neither the eye, the taſte, ſmell, or feel give the ſmalleſt notice of there being any infection preſent. It is true, indeed, that a felon coming out of a dirty goal ſpreads noxious vapour very ſenſibly, and very fatally, but the author has often experienced both in St. Thomas's Hoſpital, and in other places, that patients have lain ill of fevers very infectious, and from whom infection has been actually received, ſo as to produce the diſeaſe in other perſons, where there was no peculiar ſmell or taſte, nor any thing ſenſible to the eye in the atmoſphere ſurrounding them, or to the feel.

Although this infectious matter is not ſenſible, that there does ariſe ſome matter from perſons in fever, is farther rendered extremely probable, as a perſon coming from a man afflicted with it into another room, where there were perſons in health, ſome of theſe have afterwards been ſeized with the diſeaſe; ſometimes ſeveral, as the author has known inſtances of. A peculiar matter, therefore, is generated in the body of a man in fever, which is carried by the atmoſphere, and applied to ſome part of the body of a perſon in health, and cauſes fever to take place in him.

This matter has been ſuppoſed by ſome incapable of communication by other means than by the touch of ſome part of the body. That this is not the caſe is moſt certain, from the author's experience, for he has ſeen ſeveral perſons affected who only accidentally came into the room where the patient lay ill, without coming near him, or touching any thing in the room, excepting the floor with the ſoles of his ſhoes.

The other properties of this infectious matter are not at all known, as its exiſtence is only known by its effect in producing the diſeaſe. No chemical examination of any of the fluids or ſolids of the body has ever ſhown its exiſtence.

This infectious matter is produced by all fevers whatever. However, as far as the author knows, no perſon has been ſeized with fever in conſequence of coming near another afflicted with it, where the fever conſiſted of one paroxyſm only.

That intermittent fevers produce this matter, or in other words, are infectious, the author knows from his own obſervation as well as from that of others. But intermitting fevers are not nearly ſo apt to produce it, or at leaſt to propagate it as continued fevers, and the more violent the continued fever is in its febrile ſymptoms, the greater quantity of infectious matter is produced.

When a number of perſons live in a ſmall ſpace, ſuppoſing even that they are kept as clean as poſſible, it happens frequently that fever ariſes in ſome, often in many of them. It has been in this caſe ſuppoſed, and is extremely probable, that ſome peculiar ſpecies of matter is produced capable of producing fever, on being applied to the body. If the air in ſuch place be not frequently changed, the quality of the infection and its power are greatly encreaſed, and become often extremely fatal.

This ſource of infection is not peculiar to the human ſpecies. If a number of ſheep be confined in a ſmall ſpace without ſufficient circulation of air, an infectious matter is generated, which produces fever in them. Fevers alſo ariſing in theſe animals occaſion the formation of infectious matter. Of this the author had an opportunity of being well acquainted with during the American war, when live ſheep were attempted to be tranſported from England to America, and it was neceſſary to confine a number of them together in one ſhip. Although they were ſelected from flocks in perfect health, where they throve at ſea perfectly when taken in ſmall numbers to ſerve for freſh proviſions for the officers, yet in many of the ſhips where numbers were confined, an infectious fever aroſe, even before they quitted the harbour. Whether it be that ſheep are more ſubject to produce infectious matter when many of them are confined together, or that it more frequently happens that many of them are oftener confined together in a ſmall ſpace, without ſufficient ventilation, than quadrupeds of other ſpecies: infectious matter is much more commonly generated in them than in any other quadrupeds that are known.

Live hogs were alſo attempted to be exported in the ſame manner, and infection was produced among them, although not ſo frequently. It would appear that the infection which produces fever, either ariſing from fever itſelf, or from numbers confined in a ſmall ſpace, in one ſpecies of animal, is not capable of producing fever in another ſpecies; for it happened, that when one ſide of a ſhip contained ſheep, the other hogs, that if a fever broke out among the ſheep, the hogs were not affected; and that when fever broke out among the hogs, the ſheep in many caſes were not at all infected, neither were the crews at all affected, being as healthy as the crews of other ſhips making the ſame voyage, loaded with different commodities.

The infectious matter produced by a number of men living in a ſmall ſpace, as well as that produced by fever, may adhere to a perſon in perfect health, ſo as to be brought into another place, and communicate the diſeaſe to a great part of a whole aſſembly, as has been too often proved by a felon brought from goal into a court of juſtice, and infecting almoſt the whole of the perſons aſſembled, and that even when the felon himſelf was perfectly free from fever, and never had been affected by the diſeaſe.

It often happens when numbers of perſons are confined together in a ſmall ſpace, that putreſcent ſubſtances are not thoroughly cleared away; hence, a perſon, brought out of a goal where putreſcent ſubſtances have been accumulated, carries with him ſubſtances of a peculiar ſmell. Hence, ſome have ſuppoſed that the infectious matter produced in this laſt way had ſenſible qualities. This is, undoubtedly, not always the caſe, ſince infection has ariſen from a perſon brought out of rooms in which numbers had been confined for ſeveral months, but kept clean from all putreſcent matter, ſo that there was no particular ſmell, or any ſenſible quality. In one caſe that came under the obſervation of the author; a perſon under ſuch circumſtances from whom no peculiar ſmell aroſe, or any other ſenſible effluvia, communicated the infection to four others, with whom he was carried in a coach for about half a mile, ſo as to produce fevers in all of them, which fevers were violent and fatal.

As, therefore, neither the infectious matter produced in the body of a man afflicted with fever, or produced by a number of men living for a certain time in a ſmall ſpace, have any other ſenſible quality but that of producing fever, it cannot be determined whether it be one ſpecies of infectious matter or different ones.

The vapour or other matter which ariſes from putrifying bodies, either animal or vegetable, being applied to a perſon in health alſo occaſions fever. From putrifying ſubſtances, we know that there ariſe gas, inflammable air, and a vapour, reſembling in its ſmell what has been ſometimes called hepatic air. It does not appear, however, ever to have happened that fever has ariſen ſoon after the application of either of theſe vapours, when produced in other ways; as for example, when gas ariſes from the earth, as it does in the caves near Pyrmont, or when it has been detached by acids from calcareous ſubſtances, it has never produced fever. Neither have men expoſed to inflammable air ſet looſe in diſſolving metals in acids, nor when hepatic air has been extricated by acids from hepar ſulphurus, or when it has ariſen from the earth, been affected with fever more than under any other circumſtances. It would not, therefore, appear that it was either of theſe vapours produced during putrefaction, which give occaſion to fever. Whether, therefore, it be the ſame matter riſing into the air from putrifying ſubſtances with that which is formed from a number of perſons living in a ſmall ſpace, or in the body of a perſon labouring under a fever or not, cannot be determined. Certain it is, that the infectious matter which is thrown into the atmoſphere from the body of a perſon infected with fever ariſes often without the ſmalleſt appearance of putrefaction in the body of the man ſo affected, either in the appearance of the blood, of the ſolids, or any of the ſecreted fluids, although it be true that it happens, not uncommonly, that very evident appearances of putrefaction take place in fevers, which are very infectious, yet in a great many fevers that are ſo, there are no appearances of putrefaction. It is alſo true, that if a number of perſons live in a ſmall ſpace, if care be not taken to remove all kinds of putreſcent matters, fevers will ariſe much ſooner, and more frequently; yet if the utmoſt care be taken to remove all putreſcent matters, fevers will nevertheleſs ariſe. It would, therefore, ſeem probable that either the cauſe of fever, conſiſting of matter produced in the body of a perſon affected with this diſeaſe, was different from that produced by putrefaction, or might be generated without any putrefaction taking place, and that the matter capable of producing fever, generated by a number of perſons living in a confined ſituation, was different from that occaſioned by putrefaction, or that it might be generated without any putrefaction taking place.

Infectious vapours produced in theſe ways occaſion fever ſimply, which may, and often does go through its courſe without any diſeaſe neceſſarily happening afterwards. But there are other infectious matters which neceſſarily give occaſion to another diſeaſe after the fever has taken place.

The firſt of theſe to be noticed is variolous matter. This matter, in as far as experience has ſhown us, has never been originally produced ſince the diſeaſe became known to Europeans from Aſia, when the greateſt part of it was under the dominion of the Abaſſides. If mankind had one origin, undoubtedly, it could not have exiſted from the beginning of the world, otherwiſe it muſt have deſcended to the Greeks and Romans, who, undoubtedly, were not a cquainted with the diſeaſe. The probability of its ariſing originally at any one period of time, or any other, is therefore, exactly equal. The Romans were well acquainted with all the parts of Africa, Egypt, Arabia, and Aſia, which were under the dominion of the Abaſſides; therefore, certainly it did not exiſt in, and was not brought from any of thoſe countries. It is more probable that it was firſt generated in Aſia, during the reign of that dynaſty. There is ſome ſuſpicion of one other ſource. It might have exiſted in, and have been brought from, Indoſtan. It is ſingular that ſuch a diſeaſe ſhould be ſo little noticed in a country, with which not only England, but many other European nations have had ſo much connection. The reaſon is, that all infants are inoculated by a ſet of itinerants, whoſe ſole buſineſs it is to traverſe the country for that purpoſe. Although, therefore, the Greeks and Romans had ſome intercourſe with Indoſtan, they might not, more than ourſelves, have obſerved, or been infected with the diſeaſe. Variolous matter has its infection, like the infection produced by fever, confined to the human ſpecies. Whether other ſimilar infections exiſt among other animals has not been aſcertained. Variolous matter is capable of producing fever applied floating in the air to ſome part of the body which has not been aſcertained. Some have contended, that it was neceſſary the matter ſhould touch ſome part of the body by ſome ſubſtance covered with it being applied to it, and not floating in the air. But in the firſt place, the author has known ſeveral perſons infected, certainly without any ſuch contact; even perſons going into a room where the patients labouring under ſmall-pox were confined, have brought the variolous matter adhering to their cloaths, or perſons, into another place, where perſons who never had been affected with the diſeaſe were, and have communicated the infection without contact. Moreover, the author has rubbed variolous matter upon the ſkins of perſons who have never had the diſeaſe, where there was no wound without producing the diſeaſe in that perſon. If variolous matter be applied to the noſtrils in a fluid form, the diſeaſe will frequently be produced. If the ſcarf ſkin be raiſed by the ſmalleſt puncture, and variolous matter be applied, the fever will enſue. When variolous matter produces the diſeaſe, the fever does not ariſe immediately, but when it is applied, by making an opening through the ſcarf ſkin, or deeper, an inflammation takes place, and a ſuppuration enſues. As ſoon as this operation is completed, which is on the ſeventh or eighth day, the fever comes on. When the matter is applied, floating in the air, it is generally about fourteen days before the fever is produced. When any puſtule is formed from applying variolous matter in a fluid form to a puncture, made ſo as to penetrate the ſcarf ſkin, or deeper, ſuch matter is capable of propagating the diſeaſe. The quantity of matter ſo applied is certainly not neceſſarily more than the 1000 part of a grain, probably not more than one of a great many millioneth parts of a grain.

Another matter to which all the obſervations may be applied that have been made with regard to variolous matter, is that which produces fever followed by the meaſles, excepting that it ſeldom happens, although ſometimes that the introduction of it into a wound penetrating the ſcarf ſkin produces fever.

There are other ſuch matters producing fever, followed by what has been called chicken-pox, ſwine pox, &c. which are much ſlighter diſeaſes, and have not been well defined.

Another kind of infection which produces fever is that which produces the plague in Syria. Every diſeaſe which has, in a ſhort time, been very fatal to a great number of the inhabitants of any country has been called the plague. A fever, for inſtance, accompanied with a dyſenteric affection at Naples. A remittent, upon the Euphrates, as deſcribed in the Tranſactions of a Society for Promoting Medical and Chirurgical knowledge, in London. That which takes place in Egypt and in Syria, and of which a clear deſcription has only been given by Dr. Ruſſel, ariſes certainly from an infection of a particular ſpecies. It cannot be gathered from the accounts whether this may be originally produed without having been propagated as the firſt claſs of infections are. It is followed moſt frequently, if not always, by inflammations of the lymphatic glands. This infection has ſometimes been brought into Europe, as was the caſe at Marſeilles; but that diſeaſe called the plague, which ravaged this country, on conſidering the hiſtories of the diſeaſe, ſeems to have been a fever, produced by infections of the firſt claſs which have been enumerated. For the inhabitants of this country, it is undoubtedly a matter of great moment to decide this point, but it would make too great a digreſſion. The author may, perhaps, lay the evidence before the public in an appendix.

All and every kind of infectious matter capable of producing fever, or any other diſeaſe, by floating in the air, and being applied to ſome part of the body, is capable of chemical combination with the vapours that conſtitute the atmoſphere. In this as in all other chemical combinations that are perfect, the properties of the elements are loſt, and new properties are acquired. The atmoſphere is found to conſiſt of various vapours, of which air, or as it has been called pure air, or reſpirable air, forms at preſent about a fourth. Gas forms ſome part, but the greateſt part conſiſts of one or more vapours, which without any poſitive quality, but from that indolence, which makes mankind in their reſearches attempt to find a reſting place, have been conſidered by many chemiſts as one individual ſpecies, under the names of phlogiſticated air, &c. which, of theſe vapours that conſtitute the atmoſphere, unite with the infectious ſubſtances creating diſeaſes, is not known. If it were not for this combination, thoſe infections would ſoon ſpread deſolation over the whole earth. How far a quantity of infectious matter may be carried without being combined with ſome of the vapours conſtituting the atmoſphere is not known: certainly not to a great diſtance. It appears pretty clearly, that the infectious matter of the plague cannot reach more than twenty or thirty feet, ſince men may converſe with thoſe afflicted with the diſeaſe at that diſtance with perfect ſafety. Variolous matter ſeems capable of reaching farther, ſince there is an inſtance where ſoldiers paſſing through a town in which there were patients in the ſmall-pox being affected, although they paſſed through the middle of a broad ſtreet with celerity, in order to avoid the infection, were infected. It, however, isnot to a very great diſtance that it can reach without combining with the air, ſo as to have its properties deſtroyed. The diſtance depends, undoubtedly, partly upon the diſpoſition of the atmoſphere; not only the infectious ſubſtances floating in the air capable of producing fevers, and other diſeaſes; but likewiſe the eſſential oils riſing from vegetables, and vapours of other kinds, which affect the ſenſe of ſmelling, are ſo combined with air as to loſe theſe properties before they reach that diſtance, where they ſhould be ſo diluted as to become inſenſible. If the air be loaded with moiſture, they reach to a much greater diſtance. Vapour ariſing from a field of beans, for inſtance, or a putrid ditch, is ſenſible to the noſtrils at a greater diſtance if the air is moiſt. Hence it has been conjectured that thoſe infectious ſubſtances which float in the air, producing fevers, and other diſeaſes, may alſo be carried farther when the atmoſphere is loaded with moiſture. But this has not been determined by any accurate experiment. It is hardly worth noticing the ſuperſtitious idea, that meat raiſed up into the air would putrify, and other things of the ſame ſort, founded on no ground of experiment.

There are many infectious ſubſtances which float in air, or may be applied to the human body otherwiſe, which produce diſeaſes of a particular part, occaſioning affection of the whole ſyſtem, that has often been called fever; but theſe affections of the ſyſtem are by no means the diſeaſe the author deſcribes under that name. The matter which produces the eriſipelitous ſore throat, called the putrid, or ſore throat attended with ulcers, &c. is a matter which, riſing from a perſon afflicted with that diſeaſe, communicates the diſeaſe to perſons not affected. The diſeaſe produced in this caſe is an inflammation of the mucous membrane in the throat, and likewiſe ſometimes in other parts of the body. In conſequence of this, an affection of the whole ſyſtem takes place, which depends entirely on the diſeaſe in the mucous membrane; when this ceaſes, the affection of the ſyſtem ceaſes likewiſe. Although, therefore, this affection of the ſyſtem has many appearances ſimilar to thoſe which ariſe in fever, yet they differ moſt eſſentially from this diſeaſe.

In the ſmallpox, if the infectious matter be applied to a wound, an inflammation is produced in that wound, in conſequence of which a fever ariſes. If the poiſon of a bee be infuſed into a wound made by the ſting of the ani- mal, or if the poiſon of any other animal be injected into a wound by its ſting or tooth, an inflammation ariſes in the part where the wound is made, and that inflammation produces affection of the whole ſyſtem, ſome of the ſymptoms of which may be ſimilar to fever, but which are not the diſeaſe intended to be deſcribed here by that name. It might happen that a great inflammation might be immediately produced in a wound, into which variolous matter was infuſed; that ſuch an inflammation may produce

duce affection of the whole ſyſtem in a day or two afterwards; yet that affection is by no means to be called fever; the fever which takes place being only induced after the ſuppuration of the wound is complete, which is on the ſeventh or eighth day. It is alſo to be obſerved, that when, in conſequence of a fever produced by infectious matter, ſome topical inflammation ariſes, and the fever is carried off by it, that ſuch topical inflammation, as in the ſmall-pox, produces affection of the ſyſtem, in which ſome of the appearances are ſimilar to ſome of the appearances which take place in fever. Such affection of the ſyſtem has frequently been called fever. In the ſmall-pox, for inſtance, ſuch affection has been called ſecondary fever, although it in no way has any thing of the eſſence of this diſeaſe.

It happens likewiſe that fevers not produced by infectious matter of any kind give occaſion to inflammation, and that inflammation produces affection of the ſyſtem, which has been called by ſome authors fever. This will be conſidered fully afterwards.

What the author has been endeavouring to inculcate at preſent is, when infectious matter produces any topical affection. and that topical affection produces affection of the ſyſtem, which depends entirely on the continuance of the topical affection, ſo that the affection of the ſyſtem diſappears or begins to diminiſh, and gradually goes off as ſoon as the topical affection ceaſes; ſuch affection is not the diſeaſe deſcribed in this treatiſe under the name of fever.

The next cauſe producing fever, is ſudden expoſure to cold. It happens, undoubtedly, that infectious matter may be applied to the body ſo as to produce fever, and it may be ſome time afterwards before the fever ariſes, but the author is not diſpoſed to allow that ſudden expoſure to cold occaſions fever to take place, unleſs ſome ſymptom of the diſeaſe appeares immediately. It muſt be obſerved, however, that it is not neceſſary when a fever ariſes from any cauſe, that a compleat attack of the diſeaſe ſhould take place at once. It often happens that ſome ſlighter ſymptoms appear, and continue for ſeveral days, before a compleat paroxyſm takes place, or the fever can be ſaid to begin, as will be afterwards explained. When a man, for inſtance, is expoſed to putrid vapour, it happens frequently that head-ach, languor, loſs of appetite, and reſtleſſneſs take place, and continue for two or three days, or even a much longer time, before a perfect paroxyſm comes on.

A diſtinction at preſent wiſhed to be made is, on the one ſide, of the three firſt kinds of infection; viz. that which is produced in the body of a perſon afflicted with fever; that which is produced by many men living in a ſmall ſpace; and that which is produced by putrefaction; between theſe and variolous and other matters producing eruptive fevers, and perhaps peſtilentious matter on the other ſide; there is this difference, that when ſymptoms of the firſt ſtage of fever, ſuch as head-ach, languor, &c. takes place from the firſt claſs, they frequently go off again without any fever enſuing; but if they take place from the ſecond claſs, whether they continue or go off, the fever certainly enſues.

When theſe partial febrile ſymptoms ariſe from infectious matters, they frequently occupy only ſome part of the ſyſtem at firſt; continue for a greater or leſs time, without forming a perfect paroxyſm; go off ſuddenly, or ſlowly; or after continuing ſome time, all at once bring on a compleat attack of the diſeaſe.

The mind of man is ſo much impreſſed with the idea of referring effects to cauſes, that it will not be ſatisfied without reſting itſelf upon ſome cauſe. Sudden expoſure to cold produces diſeaſes ſo frequently, that when perſons, at leaſt in this country, are ſeized with diſeaſe, and cannot remember any thing which happened out of their ordinary courſe of living, they reſt on the idea that they have caught cold. But if a man had been ſuddenly expoſed to cold, and continued in perfect health for four and twenty hours, the author would never allow that fever, or any other diſeaſe, was owing to it. A perſon may have come near another in very violent fever without catching the diſeaſe, ſo he may be ſuddenly expoſed to cold without having fever produced in conſequence, We know that in Ruſſia, as well as in other parts of the earth, men out of an heat of at leaſt 160° of Fahrenheit's thermometer, plunge themſelves ſuddenly into ſnow or water cooled to the freezing point, without fever or any other diſeaſe being the conſequence. Some practitioners of great eminence have believed that ſudden expoſure to cold never produced fever, or any other diſeaſe. A rule of evidence muſt be applied here which has already been taken notice of, that a perſon may be expoſed to a cauſe of diſeaſe without catching it, that every perſon expoſed to the air near a patient afflicted with fever is not ſeized with the diſeaſe, yet a greater number of thoſe expoſed to it are ſeized with the diſeaſe, than of thoſe who did not come near perſons afflicted with fever; nevertheleſs this is a ſufficient ground for believing that ſuch expoſure is the cauſe of the diſeaſe. So if a greater number of perſons ſuddenly expoſed to cold have been ſeized with fever, than others who were in other reſpects in the ſame circumſtances; it is a ground ſufficient to eſtabliſh that ſudden expoſure to cold is a cauſe of this diſeaſe. But the evidence is much ſtronger in this caſe than in that of infection, becauſe the author has ſeen many inſtances, where, from the expoſure to cold, the commencement of the diſeaſe was inſtantaneous, and many are to be found on the records of medicine. The author aſſumes that this cauſe only operates when its effects are to be immediately obſerved, either as inſtantly producing the diſeaſe, or ſuch ſymptoms of it as afterwards ſpread over the whole ſyſtem, ſo as to make a compleat attack; for, as has already been obſerved, when a cauſe of fever is applied, it happens not uncommonly, that head-ach, languor, and other ſymptoms of the attack, or firſt ſtage of fever take place, and continue for ſome days, as far even as fourteen, from the author's obſervation, before a compleat paroxyſm has been formed; but this will be diſcuſſed more fully afterwards.

The feel of heat or cold by no means indicates the real temperature of the atmoſphere. This is a ſubject ſo well underſtood that it is ſufficient to obſerve, that by ſudden expoſure to cold is meant the going out of a warmer into a colder medium, whether it be the ſame, excepting as to its temperature, or different in ſubſtance. For example, if it be going out of the air of the atmoſphere into the ſame air, only of a leſſer temperature, or going out of warm air into cold water. It is not of conſequence that the change ſhould be from one particular degree of heat ſhown by the thermometer to another. If, as it is not uncommon for ſeveral weeks together in the interior parts of Africa, the temperature of the atmoſphere be at 130° of Fahrenheit's thermometer, and a perſon was brought from that heat ſuddenly to one of 100°, that, the author believes would be ſufficient expoſure to cold to produce fever, although he has no inſtance of this having actually happened, there having been very little intercourſe between this country, and that part of Africa, or any other where the heat is continued of any thing near that temperature for any conſiderable length of time. The inſtances are numerous where the heat is 100°, of fever being produced as well as various other diſeaſes by a ſudden diminution of heat to

80°,

80°, and the author has known inſtances of fever produced by going ſuddenly from an heat of 60° to 40°.

Sudden expoſure to a colder medium is apt to produce many diſeaſes beſides fever. It would ſeem that a ſudden diminution of the temperature of the medium to which a perſon is expoſed when the thermometer ſhows an high temperature of heat is moſt apt to produce fevers, and this ſeems to be one cauſe why fevers are more frequent in warm than in cold climates; the ſudden diminution of the heat of the medium being more apt in colder climates to produce catarrhs, rheumatiſm, &c. Why this happens is not attempted to be explained, as it is meant in this treatiſe to adhere entirely to a relation of obſervations and experiments.

Suppoſing a perſon were to paſs through a column of a warm atmoſphere not an inch in thickneſs, and immediately again into an atmoſphere of the ſame temperature he was in before, undoubtedly no fever would be produced. It is neceſſary, therefore, that he ſhould remain ſome time in the warm atmoſphere before his going into a cold one is ſufficient to produce the diſeaſe. The heat of the atmoſphere muſt put the ſyſtem into ſome ſtate, that the ſudden expoſure to cold may act upon it ſo as to occaſion the diſeaſe. The obvious effect of remaining in the warm atmoſphere is to produce a greater circulation in the exterior parts of the body, greater evaporation into the atmoſphere, and a greater exudation from the ſkin. The obvious effect of expoſure to cold is to produce contraction of the exterior veſſels, of courſe, that a greater quantity of blood ſhould be contained in the interior veſſels, that there ſhould be leſs evaporation from the body generally, and leſs or no exudation from the ſkin. Sudden and ſlow expoſure to cold produce theſe effects equally, therefore it cannot be from the ſimple contraction of the exterior veſſels, the ſimple diminution of vapour riſing from the body, or the ſimple diminution of the exudation from the ſkin that the miſchief ariſes; for it is certain, that gradual diminution of the heat of the medium has never been obſerved to produce fever, or, indeed, any other diſeaſe. All other conjectures about the mode of ſudden expoſure to cold producing fever are ſo extremely nugatory as not to be worth the leaſt notice. That checking the inſenſible perſpiration, or producing contraction which has been called ſpaſm, or by any other term, is the cauſe of ſudden expoſure to cold producing fever has been much received, and, perhaps, might require fuller diſcuſſion, were it not that contraction, and obſtruction of the inſenſible perſpiration may be equally produced by ſlow as by ſudden expoſure to cold, and without any miſchief, which the author thinks ſufficiently refutes this doctrine, eſpecially as when a fever is actually produced it is independent entirely of its cauſe.

All the advantage which ariſes from the knowledge of the cauſes of fever, is the prevention of the diſeaſe, and this accounts for the ſlovenly manner in which authors have treated of its cauſes.

In order that ſudden expoſure to cold ſhould produce fever, it is not neceſſary that the whole of the exterior ſurface of the body ſhould be expoſed to it. It is ſufficient that a cold ſubſtance be applied to part of the ſurface, or that a cold fluid ſhould be thrown into the ſtomach. It muſt be obſerved, however, that although there are many inſtances of cold being applied partially, or of a cold fluid thrown into the ſtomach producing fever, yet a partial expoſure of cold is more frequently followed by other diſeaſes, eſpecially internal inflammation, as pleuriſy, &c. and farther, ſudden expoſure to cold is followed, perhaps an hundred times or more by other diſeaſes, for once that is followed by fever. If a man, when fatigued, is ſuddenly expoſed to cold, the expoſure is much more frequently followed with diſeaſe, and particularly by fever. For example, if a man has been in a crowded aſſembly, where his attention has been ſtrongly excited, and comes ſuddenly out into the cold air; or, if he has been fatigued by exerciſe, if he ſhould throw himſelf into cold water, there are many inſtances of fever having immediately enſued. It does not appear from any well attеſted evidence, that fatigue encreaſes the powers of any of thoſe ſubſtances which, floating in the air, and being applied to the body, give occaſion to the diſeaſe.

The next cauſe to be taken notice of is moiſture. A man going into water of a moderate temperature, and remaining in it for ſome time, has not been found more frequently afterwards affected with fever, than after ſtanding, walking, or any other indifferent circumſtance. It is certainly, therefore, not the application of water to the body that gives occaſion to the diſeaſe, but if the air has particles of water floating in it, and a man has continued for ſome time in ſuch an air, fever has enſued much more frequently than when he had lived in a dry air. It is to be obſerved, that water may be in the air in three different ways. Small particles of water may be ſuſpended in the air like any other matter reduced to very fine particles; for, although water be of greater ſpecific gravity than the vapours which form the atmoſphere, yet many other ſubſtances of much greater ſpecific gravity than water are frequently ſeen ſuſpended in the air. This is eaſily demonſtrated by allowing a ſmall portion of the rays of the ſun to paſs through a ſmall hole into a darkened chamber, theſe particles are at all times diſcernable. The air, although of ſmall ſpecific gravity, is exceedingly viſcid, and, therefore, if particles of any matters are blended with it by any power, they will fall down very ſlowly, or if there be any agitation will be altogether ſuſpended, and the atmoſphere is almoſt always agitated with various currents. A ſolution of gum arabic in water is not of much greater ſpecific gravity than pure water; but while ſmall particles of ſand, clay, &c. ſink readily in pure water, yet they they will be ſuſpended a long time in a ſolution of gum arabic, in which, if there was any conſiderable agitation, they would not ſink at all. It is not neceſſary to ſay how theſe ſmall particles of water are thrown into the air.

When theſe particles are found in the atmoſphere, they maintain all the properties of water, moiſten ſubſtances, ſo as to lengthen or ſhorten them according to their texture, and the quantity of the particles of water may be aſcertained in ſome degree by an hygrometer, an inſtrument commonly meaſuring the lengthening and ſhortening of ſubſtances.

Secondly, of the vapours which conſtitute the atmoſphere, ſome one or other, or all of them are capable of combining with water chemically, ſo that the properties of theſe vapours and the water are loſt, and the water ſo combined does not affect ſubſtances ſo as to lengthen or ſhorten them, nor does it diſturb the tranſparency of the atmoſphere, which water ſuſpended in the atmoſphere in the manner firſt deſcribed does, and is often extremely ſenſible to the eye without any aid, but much more perfectly if objects are viewed at a diſtance through a teleſcope of great magnifying powers. If the atmoſphere is hot or denſe, it is capable of combining chemically with a larger proportion of water. If it ſhould be ſaturated with water, therefore, in any particular degree of heat or denſity, if the heat or denſity ſhould be diminiſhed, it is ſeparated, and mixed with the atmoſphere in the firſt manner, as is eaſily obſerved. If the weather ſhould become ſuddenly very warm, and the heated air ſhould be made to paſs through a large building, the walls of which have not had time to acquire the heat of the atmoſphere, the water is not only condenſed upon the walls, but the atmoſphere of the building loſes its tranſparency, and appears very moiſt by the hygrometer. Thirdly, if the vapours conſtituting the atmoſphere ſhould be heated to a degree equal to that in which water boils, which differs, according to the preſſure on its ſurface, in that caſe, after the atmoſphere had diſſolved as mnch water as would ſaturate it, the remaining part of the water would not be in ſmall fluid particles, but in the form of vapour, and would mix with the other vapours of the atmoſphere exactly as they are mixed with one another. As ſoon as the heat ſhould be ſo diminiſhed, as to be leſs than that which water would boil at with that degree of preſſure, then the water would return to its fluid form, and be ſuſpended in ſmall particles. Of theſe three different modes of ſuſpenſion of particles of water in the atmoſphere, the firſt only has been called moiſture, and it is this only which has been found to occaſion fever. It is true, that if water be contained in the atmoſphere in either of the other ſtates, it may eaſily be reduced to this by the means that have been already ſtated.

Some have contended that the application of water ſuſpended in the atmoſphere in the form of moiſture did not produce fever. If thoſe who have held this doctrine were to live a year or two in Batavia, they would be convinced, by fatal experience, that men living in a moiſt atmoſphere are more frequently affected with fever than in a dry one.

Men wearing any moiſt covering have been more frequently affected with fever than thoſe who have worn cloaths not moiſtened with water. Vaſt numbers of men have worn moiſt cloathing, and have lived in moiſt atmoſpheres without any fever having taken place immediately afterwards. Hence, many have conceived that theſe were not cauſes of fever. But the obſervation of ſo many men being immediately ſeized with fever, as well as other diſeaſes, after being expoſed to moiſture, more than in thoſe who have worn cloaths free from all moiſture; the other circumſtances being the ſame, both recorded in the annals of medicine, and that have come under the author's inſpection, give as full evidence that moiſt cloaths are capable of producing fever, as any that can be generally procured with regard to the cauſes of diſeaſes.

The frequency of fever immediately following a perſon's having been covered with moiſt cloaths, is not the ſame indiſcriminately, whatever ſubſtance, or texture they are of. There are ſome ſubſtances, and certain textures which conduct heat and cold more readily, that is, on being brought near an heated body, receive heat from it more readily, or more ſlowly. A piece of lead, for inſtance, placed near an heated body will acquire the heat of that body ſooner than a piece of chryſtal, or cold if it be placed near a cold body; all other circumſtances, excepting the ſpecies of matter, being made equal. Wool, although the ſubſtance be the ſame, if it be wove into a looſe cloth ſuch as flannel, will become hot or cold more ſlowly, if it be brought near an hot or cold body, than the ſame wool wrought into a cloth of a firm texture, ſuch as camblet. If men are covered with ſubſtances, which either from their ſpecies or texture receive heat or cold more quickly, and theſe ſubſtances are moiſtened with water, fevers will more frequently enſue than if they were covered with ſubſtances that receive heat or cold more ſlowly.

Moiſture in the air, or coverings of the body, produce more fevers, the warmer the atmoſphere, but moiſture produces fever in all temperatures. The Dutch have endeavoured to make the country of Batavia reſemble Holland in the immenſe number of canals. The conſequent moiſture of the atmoſphere is very great in both places; but, although fevers, therefore, frequently occur in Holland, they bear no compariſon to thoſe which happen in Batavia, where the fatality, owing to the moiſture of the climate, is ſo great, that it is wonderful any perſon ſhould ever approach that ſettlement, but from the abſolute impoſſibility of otherwiſe obtaining water or food.

When the air is moiſt in conſequence of water evaporating from a marſhy country, or from canals in which the water is ſtagnating, or moving with a very ſlow motion, fevers more frequently ariſe than when the moiſture proceeds from the ſea, large lakes, or rivers confined within their banks, and running with a conſiderable degree of rapidity. While fevers are frequently produced in the fens of Lincolnſhire, few ariſe on the banks of the Thames. This has given occaſion to ſuppoſe that ſome other vapours proceed from ſuch marſhes beſides water, and produced the diſeaſe. It certainly happens often that a conſiderable degree of putrefaction takes place in marſhy grounds, and more eſpecially in warm climates, but it is by no means to be concluded, that moiſture in the atmoſphere always produces fever in conſequence of putrefaction. Putrefaction can only take place in animal or vegetable ſubſtances. If water, therefore, not impregnated with either, ſhould be in ſuch a ſituation as to produce moiſture in the atmoſphere, no putrefaction can take place, therefore, if fevers enſue, they are certainly in conſequence of moiſture, not putrefaction. Many inſtances of this may be brought, as in the war which took place in Flanders between the tenth and eleventh years of the preſent century, an army encamped upon ſandy ground, in which water was found in digging leſs than a foot deep, and occaſioned a great moiſture in the air, which produced in a few days numbers of fevers, although the army was perfectly healthy before, and no more fevers were produced on ſhifting their ground. There are a vaſt many other inſtances of the ſame thing having taken place. Beſides, fever has often ariſen immediately in perſons ſitting in rooms, the floors of which had been juſt moiſtened with pure water. Although therefore ſubſtances ariſing from putrefying animal and vegetable matters in marſhes or other ſtagnating waters, may render the vapours ariſing from them more dangerous, yet it does not follow from thence, that the particles of the water forming the moiſture of the atmoſphere, may not of themſelves be the cauſe of the diſeaſe.

Another idea ſuggeſts itſelf, that ſince water applied in a body, that is to ſay, if a man immerſes the whole, or any part of his body in water, of the temperature of the atmoſphere, in which he has remained for ſome time, or if he throws water of ſuch heat into his ſtomach, no diſeaſe enſues; and ſince water in ſmall particles in the atmoſphere applied to the body is of the ſame heat with the atmoſphere, and is applied to parts of the body only, it cannot be the mere application of the particles of the water that produces the diſeaſe; it muſt, therefore, be ſomething that they apply to the body which occaſions it. What this may be is not very clear. As evaporation of water into the atmoſphere produces cold, and ſolution of water in one or all the vapours which conſtitute the atmoſphere, likewiſe produces cold; ſome have conceived, that it was the production of cold which is the cauſe of the diſeaſe, and that, therefore, moiſture might only be a means of ſuddenly applying cold to the body, and that the effect of moiſture was to be aſcribed to cold. But this the author leaves to future experiment and diſcuſſion.

The next cauſe producing fever is eating certain food.

Putrid and infectious ſubſtances applied to the body, as has been already deſcribed, may either produce a fever immediately upon their application, or the body may be in perfect health for ſome time afterwards, to all external appearance, before the diſeaſe comes on; but when fever is brought on by cold, or moiſture, the author has already ſtated that the diſeaſe took place immediately, that is to ſay, either a compleat paroxyſm of the diſeaſe, or ſome of the ſymptoms of the firſt ſtage were very ſenſible, and continued, until in a ſhort time afterwards, they ſpread over the whole body, ſo as to conſtitute a complete paroxyſm. The ſame thing is to be obſerved with regard to food, for there is no ſpecies of food eaten, which after, it has gone through the digeſtive organs, has been found to be followed by fever.

When food, therefore, is the occaſion of fever, it is by its action upon the ſtomach, or other organs of digeſtion.

Food of difficult digeſtion produces, undoubtedly, a variety of different diſeaſes, of which however, fever is ſeldom one; the author has never ſeen it, excepting in one caſe. But when a perſon has been afflicted with fever, and recovered from it, either by a natural criſis, the diſeaſe going through its natural courſe, or by medicinal application; if ſoon after he ſhould make uſe of food too difficult of digeſtion for the powers of the ſtomach, which have been generally weakened by the diſeaſe, a new attack of it has taken place immediately, and before the food had paſſed through the ſtomach. Indeed, eating food difficult of digeſtion ſoon after fevers go off, ſeems to be one of the moſt frequent cauſes of the re-appearance of the diſeaſe. In a perſon who has not lately been affected with fever, purgative medicines have never been obſerved to have been followed more frequently with fever, than in perſons who had not made uſe of any ſuch medicines; but when a perſon has been lately afflicted with fever, which has been carried off naturally, or by medicines, it has often happened that a fever has returned on uſing a purgative medicine. This obſervation, although applicable principally to intermittents, alſo takes place in continued fevers.

A ſudden excitement of any of the paſſions of the mind, attended with great anxiety, has been immediately followed in ſome caſes with fever, yet theſe are ſo few as to render it doubtful, becauſe ſome of the cauſes of the firſt ſet, before deſcribed, which do not produce the diſeaſe immediately upon their application, might have been applied, and there may be a coincidence. Yet very immediate attacks of a compleat firſt ſtage, or cold fit of the diſeaſe having happened on the excitement of ſuch paſſions, renders it extremely probable that this is likewiſe a cauſe of the diſeaſe.

Theſe are all the circumſtances that have been obſerved, to which perſons having been expoſed, fevers have afterwards more particularly taken place in them.

All the cauſes, therefore, to which fevers can be aſcribed from obſervations, are: certain ſubſtances applied to the body, as floating in the atmoſphere, or applied in a fluid form to ſome part of the body. Sudden expoſure to cold. Moiſture in the atmoſphere. Moiſture of the cloaths, or other covering of the body. Indigeſtible food, or other ſubſtances affecting the inteſtinal canal. Sudden riſing of the paſſions of the mind attended with anxiety. But it happens frequently, that fevers ariſe without any of theſe circumſtances having been known to precede them.

It is true, that many of theſe circumſtances may have taken place without either the perſon in whom the fever aroſe, or any by-ſtander obſerving them. As the infectious matter, for inſtance, riſing from a perſon affected with fever, has no ſmell, nor taſte, nor ſenſible quality ; a man may chance to come near another from whence this ſubſtance is riſing without obſerving it, and having received the infection may remain in perfect health for a fortnight, or three weeks, when an attack of fever may ſuddenly take place, without the patient himſelf, or any other perſon being able to imagine that it was in any manner owing to this cauſe. This is not ſo much the caſe with expoſure to cold, or any of thoſe cauſes which bring on fever immediately, or not at all. Even if it were, fevers ariſe ſo often without our being able to make out that the patient has been expoſed to the cauſes that have been enumerated, that there muſt, undoubtedly, be other cauſes than theſe, which give occaſion to the diſeaſe, but which are at preſent totally unknown. It may not be improper to conſider ſome of theſe cauſes that have been ſuppoſed to operate.

Eating food of particular kinds has been thought by ſome to give occaſion to the diſeaſe. It has been already noticed, that eating food of difficult digeſtion has often evidently produced relapſes in fever, but hardly ever a fever originally, and that only while it remained on the ſtomach, for various nations live on various kinds of food. The Bramins eat vegetable food alone; many of the Laplanders animal food only; the inhabitants of ſome countries live on grain; of others on fruits; yet if all the other circumſtances be the ſame, fevers are not more frequent in one of theſe than in the others. Inſtances there are very frequently in this town (London) of eating too large quantities of food, and that of very difficult digeſtion; but fever is not the diſeaſe that follows more frequently than in thoſe who have eat food in ſmaller quantity, or more eaſy of digeſtion. The author has ſhown, in another treatiſe, that whatever be the food, the fluids produced from it are the ſame. Thoſe who have believed that eating food of any quality, or, in any quantity, produced fever, have formed the opinion upon mere conjecture, and not accurate obſervation. It is true, that a man who has already had a ground of fever, may have that fever come on immediately after eating food in too great a quantity, or of too difficult digeſtion. A man may have received the infection of the ſmall-pox without any external or apparent ſymptom, and the fever may have ariſen a few hours after he had gorged himſelf with turtle and veniſon; but this fever certainly was not to be aſcribed to the food. So it might be with any other infection or cauſe of fever that did not immediately bring on the diſeaſe. It requires a frequent ſucceſſion of one event following another, before one can be conſidered as the cauſe of the other. Unfortunately too much ſtreſs has been laid upon ſingle obſervations in medicine.

Men accuſtomed to wear moiſt cloaths by habit, acquire an indiſpoſition to have diſeaſe produced in them by wet cloaths, while thoſe unaccuſtomed to ſuch covering would be readily affected. So it may be thought that a man uſed from his infancy to eat any particular ſpecies of food might acquire an habit which would prevent him from being affected with diſeaſe in conſequence of it. And certainly this is the caſe, for a man who has been accuſtomed to live on animal food alone (often even in a putrid ſtate) has been found not to be affected with what is called ſea ſcurvy, or a tendency to putrefaction of the fluids, while a man who had lived on vegetable food entirely, if he had uſed animal only would, undoubtedly, have been afflicted with that diſeaſe in many inſtances. But although there be numberleſs inſtances of men changing the food from one ſpecies to another, yet there is none the author knows of in which fever has ariſen more frequently, all the other circumſtances being the ſame. Excepting, therefore, when food, by its action, while it is in the inteſtines, produces fever, which happens rarely, excepting in convaleſcents from fever, there is no ground to believe that the uſe of food of any kind is a cauſe of the diſeaſe after it has paſſed the organs of digeſtion.

The ſtate of the fluids, that is, the properties of the different ſpecies of fluids contained in the body, or their proportions, have been ſtated by many authors as the cauſes of fever; ſuch as their viſcidity, or thinneſs, their acrimony, or mildneſs, their different proportions to one another, putreſcency, &c. The properties of any ſpecies of matter can only be known by experiment. It could not be known even that water was capable of fluidity to one who was converſant only with eternal ice. Whatever, therefore, was ſaid with regard to the fluids of the human body before experiments were made to aſcertain their properties, muſt be paſſed over in oblivion. Every thing, therefore, that is ſaid with regard to the fluids before the time their properties were inveſtigated by experiments, excepting ſome of the external appearances of ſome of the ſecreted fluids, is to be entirely paſſed over, as not at all relevant to any explanation of the cauſes of this diſeaſe, or the hiſtory of it in any manner.

The firſt part of the blood which was diſtinctly marked was the ſerum. or ſome perſon about a century and an half ago diſcovered the red particles. Even Boerhaave was unacquainted with the coagulable lymph, and the properties and varieties which take place in theſe three eſſential parts of the blood, are even not well known to the majority of practitioners in Europe. It would appear, therefore, that there is very little ground for reſting the cauſes of diſeaſe, whether it be fever, or any other, on what has been affirmed of the properties of the fluids by many, even practical authors, for they knew them not, and did not examine them. The author will venture to affirm from many experiments, that the fluids being in any ſtate of all thoſe varieties which are known, the other circumſtances being the ſame, fever will equally take place. One ſtate only ſhall be ſpecified which has been laid down by ſome great practical authors, ſuch as Sir John Pringle as a cauſe of fever, viz. putrefaction of the fluids. Now we know that the blood in that diſeaſe, which is called the ſea ſcurvy, frequently verges ſo near to putrefaction, that the red globules are broken down into ſmaller particles, and the coagulable

able lymph and ſerum hardly coagulate by heat, yet fevers never ariſe from ſuch putrefaction. Frequency of the pulſe, and various other affections of the ſyſtem, undoubtedly, ariſe, and have been called fever, but are by no means that diſeaſe meant by Galen and other Greek phyſicians, if we may call Galen a Greek, Lomius, and many other modern practical authors, and which the author is deſcribing. There is then no ground from experience to believe, that any particular ſtate of the fluids is followed by fever more frequently than any other ſtate, all other circumſtances being the ſame.

It has been already obſerved, that ſome of the cauſes of fever do not occaſion it to come on immediately, it being often many days after their application before any ſymptom of it takes place. In the ſmall-pox, when caught from variolous matter floating in the air, there is no experiment or obſervation on which we can depend to illuſtrate what happened in the ſyſtem between the application of ſuch cauſes, and coming on of the diſeaſe. But the mind of man, when it cannot find cauſes from induſtrious experiment, or ſlow obſervation, takes them from imagination, and, more eſpecially in medicine, which has been conſidered as a divine art, and ſpringing from inſpiration, and many men, therefore, have believed that phyſicians could divine every thing relating to it, and this, although by no means conſonant to the other arts and ſciences, poſſeſſed by mankind, has even entered into the minds of practitioners themſelves. Many inſtances may be brought from the ancients, many from the ages of magic and romance. Nor has this idea ſubſided in modern times. The author has heard Dr. Fothergill and others, ſtate, in a ſerious harangue, their inſpiration not only in the knowledge of diſeaſes, without enquiring into their external appearances, but in making preſcriptions to flow from their pen without any previous compoſition in their mind; not in compliance with the prejudices of patients, but from their own belief.

Many authors have laid down, that when the cauſes of a diſeaſe, eſpecially fever, was not followed immediately by the fever, but after ſeveral days that that cauſe produced ſome alteration in the proportion of the blood, or ſome of the other fluids, which was the occaſion of the fever. The knowledge of medicine, however, like all other ſciences and arts, is only to be acquired by experiment and obſervation, and neither experiment or obſervation has ſhown that any of the eſſential parts of the blood have been at all altered in their properties; or in other words, that the blood has been at all altered in its properties from the time of the application of a cauſe of fever not acting immediately to the time of the diſeaſe taking place. The whole experience of any alteration is in the inoculated ſmall-pox, that a ſmall part of the matter in a particular and ſmall part of the body is converted into variolous matter, which being abſorbed, produces the diſeaſe immediately. There is no reaſon, therefore, from experiment and obſervation, conſequently, none whatever for believing that fever is ever brought on from any alteration of the quality of the fluids contained in the blood-veſſels produced by uſing any kind of food, or by any other means whatever, notwithſtanding the very univerſal opinion ſo frequently brought forward by authors on this ſubject that there is.

Of the particular ſecreted fluids which have been thought from their redundancy, or alteration of properties, to be cauſes of fever, bile has been the moſt frequent.

The ancients, whoſe knowledge of the properties of the matter of the body was very ſuperficial, and depended ſolely on the external view, on which hypotheſis were founded, ſuppoſed that the fluids conſiſted of red blood, phlegm, bile, and black bile, as is well known to thoſe who have looked into their writings, and that to a redundancy, or alteration of the qualities of theſe, diſeaſes were principally owing, and this idea has continued down to the preſent day. Bile is conſpicuous from its colour and taſte, its colour is varied by ſubſtances that it meets with in the inteſtines. This difference of appearance has made it be conſidered ſtill as of great importance in diſeaſe. But modern enquirers have ſhown that it is a fluid ſecreted only by the liver, is not at all contained in the blood-veſſels, but formed out of the ſubſtances which conſtitute the blood. There cannot, therefore, be any redundancy of bile in the blood-veſſels, becauſe generally there is no bile contained in them at all. Bile may, however, and ſometimes does get into the blood-veſſels. When it does, being capable of paſſing through all the ſecretory organs, it ſoon ſhows itſelf in all the ſecreted fluids, by giving them a colour, and converting them into a yellow dye, and by tinging all the ſurfaces of the body that are expoſed to the eye, of a yellow colour. When this happens, fever is never known to be produced, or to have followed, or taken place more frequently than in any other ſtate of the body. Bile, therefore, when it does get into the blood-veſſels, never can be accounted a cauſe of fever.

When the ſecretions of thoſe glands which open into the inteſtinal canal are encreaſed from any cauſe, the ſecretion of bile is encreaſed along with that of the pancreatic juice, mucous, &c. When theſe encreaſe conſiderably, they are evacuated upwards or downwards. Bile being the only conſpicuous one, from its colour and taſte, has often been attended to while the others have been neglected. There is no evidence that in theſe caſes the liver ſecretes a larger proportion of bile thant the other glands of the inteſtines their fluids. However that may be, apparently there is a great quantity of bile thrown out.

There is no inſtance upon record, nor none the author ever knew, where fever more frequently took place after ſuch increaſed ſecretion and evacuation than in any other circumſtance. In that ſickneſs, for example, which is produced by the agitation of a ſhip, vaſt quantities of bile are often ſecreted, and evacuated, yet there is no inſtance of fever having taken place; in conſequence therefore, bile getting into the blood-veſſels, or ſecreted in any quantity, cannot be admitted as a cauſe of fever. When ſo much has been ſaid by many authors of great eminence about bilious fever, is their authority to be thrown aſide entirely? Certainly no authority but that which riſes from obſervation and experiment can ever be allowed in true ſcience. It would be great pity to rob patients of their conſolation in being bilious or nervous, but medicine is a ſcience which never can be comprehended without much ſtudy, conſiderably more than can ever be given to it by perſons following other occupations.

Another cauſe of fever frequently referred to is heat. Heat may be conſidered in two lights, one of which is when a man lives in a warm atmoſphere, or hot medium. In the inhabitants who live in thoſe regions of the earth, where the heat of the atmoſphere is great, undoubtedly, many more fevers take place than in the inhabitants of thoſe countries where the heat of the atmoſphere is leſs. It is by no means proved by this that the ſurrounding medium occaſions fever; for it is to be obſerved, that in warm climates where there is no moiſture in the atmoſphere, from ſtagnating waters or other cauſes, fevers do not ariſe more frequently than in colder regions. In Egypt, where the Nile overflows its banks, with fertility to the ſoil it gives moiſture to the atmoſphere, which is frequently the cauſe of fever. The ſame thing happens from the overflowing of the Senegal and Gambia on that coaſt of Africa which borders upon the Atlantic Ocean. In the iſthmus of America, when at particular times of the year there are great falls of rain, fevers take place frequently, and ſo it happens in the rainy ſeaſon in all other hot countries. Where hot countries have been over-grown with woods, filling the air with moiſture, fevers very frequently ariſe, but when the country has been cleared, and the air, by that means, rendered dry, theſe fevers have diminiſhed in proportion to the cultivation, as in the caſe of the ſugar iſlands. In America, and the iſlands in the Pacific Ocean, which are neither ſubject to violent rainy ſeaſons, nor kept moiſt by ſtagnating water, or cloſe woods, although the inhabitants are numerous, fevers are not prevalent. The countries which lie to the north of the Cape of Good Hope, in Africa, are the hotteſt in the earth, but being likewiſe dry, fevers are not prevalent. Artificers employed in trade, where they are often for many hours in an atmoſphere heated to more than 150°, are by no means peculiarly affected with fever.

Fever has never been obſerved to ariſe in thoſe who have uſed a warm bath, nor were the baths of the ancients, though they remained a conſiderable length of time in air heated to a great degree, ever obſerved to produce the diſeaſe.

The remaining, therefore, in a warm medium, a ſhorter or a longer time, cannot ſimply be admitted as a cauſe of fever.

When a man remains for ſome time, that is to ſay, from a quarter of an hour to two hours, in a very great degree of heat above the common heat of the atmoſphere of the country where he lives, as in England, in an heat of 120°, 130°, or 140°, or more, the pulſe beats quicker to perhaps 120, 30, 40, or 50 ſtrokes in a minute, the whole culation is encreaſed, not only in rapidity but force, and this force of circulation ſubſides very gradually afterwards, although a man goes ſuddenly into a much colder medium. The Ruſſians, for inſtance, from what they call the warm bath, which is remaining in a chamber moiſt, and heated often to more than 140°, plunge themſelves into water nearly at the freezing point, or even into ſnow, without fever or any other diſeaſe enſuing. It might be imagined in this inſtance, that diſeaſe was prevented by an habit from infancy, but the author has had experience of many perſons coming out of mediums, heated to theſe degrees, without any diſeaſe whatever having taken place, although they expoſed themſelves ſuddenly to cold in ſuch a manner, as many of them muſt have fallen into various diſeaſes, if they had remained for an equal length of time in a chamber heated to 86°, or 90°, and then expoſed themſelves ſuddenly to cold in a ſimilar manner. The author does not mean to attempt any explanation of this fact; he only obſerves, that the difference, when the appearances take place, is, that in caſes where a man has been in a conſiderable degree of heat for a great length of time, and ſuddenly comes into a colder medium, the exterior veins continue turgid, the ſkin feels warm to the perſon himſelf, remains of a florid colour, and not contracted; whereas, when a perſon has been in a more moderate degree of heat for an equal length of time, and comes into a colder medium, the exterior veins diſappear, the ſkin contracts, coldneſs is felt in a great degree, conſiderable paleneſs appears on the body, or ſometimes it aſſumes a livid hue.

Many other cauſes of fever have been aſſigned, but with ſo little foundation that they are not worth while noticing. Neither is it worth attending to the infinite quantity of abſurd aſſertions that have every where been made in medicine, unſupported by obſervation, which is the only evidence. Who would make an experiment upon men, which would determine whether any application would produce a fever or no? and the diſeaſes of brute animals, as well as their whole economy, is ſo different from that of the human body, that no concluſion can be drawn from the one to the other. This a maxim the author's experience has ſhown him to be perfectly true.

The next point to be examined in the cauſes of fever is, whether they are capable of co-operating with one another. This is a point very difficult to aſcertain, particularly as all the cauſes of fever that we know are ſo frequently applied under apparently the ſame circumſtances, without producing the diſeaſe. The evidence is ſo incompleat, that the author dare not venture to make any conjecture on the ſubject.

The next conſideration with regard to the cauſes of this diſeaſe, although the author has treated it in a paper already publiſhed, yet it would not be proper to omit it here. If a body be put in motion by an impulſe, and no reſiſtance be made to that motion, it will continue to move on, in the ſame manner, and in the ſame direction with the ſame velocity, although no new impulſe be made. In like manner, if a fever be produced by any cauſe it will continue, although that cauſe is no longer applied. This propoſition, as far as the author knows, has not been given by any writer on this diſeaſe; it is, therefore, brought forward with great diffidence. On the contrary, it has been laid down by Sydenham, very diſtinctly, as well as by almoſt all the authors who have treated this ſubject, both ancient and modern, that the original cauſe of the diſeaſe was conſtantly acting to keep it up. Sydenham, as well as various others, has ſaid that ſome noxious matter had got into the body, exciting certain movements, which they call concoctive, by which it was deſtroyed, and thrown out of the ſyſtem. It is true, indeed, Van Helmont ſuppoſes that there is a kind of ſpirit, which, however, was to be overcome, and expelled; and Dr. Cullen, that a ſpaſm was induced, without entering into any conſideration that the ſpaſm, whatever it might be, required its cauſe to be conſtantly kept up or no.

The propoſition is, when a cauſe of fever has been applied to the body, and produced the diſeaſe, whether the diſeaſe will go on if the the cauſe be entirely removed, or whether it requires the conſtant application of the cauſe for the continuance of the diſeaſe. The author, on conſidering the hiſtory of the diſeaſe, as it has been laid down by authors who have frequently ſeen fever, and who have related particular caſes of patients afflicted with it, or its general hiſtory, as deducted from their obſervations as well as from his own experience, is clearly of opinion, that a fever once produced will go on, although its cauſe be entirely removed, juſt as a body put in motion will continue in motion, although the impelling body be entirely removed, if it meet with no reſiſtance. That is, if infectious matter of any kind be applied ſo as to produce fever, that fever will go on, although the infectious matter be entirely removed, ſo that no particle of it is either contained in the body, or touches it externally. That if any of the paſſions of the mind, attended with anxiety, produces fever, the fever will go on, although ſuch affection of the mind be entirely removed. That if fever ſhould be produced by a ſudden diminution of heat in the ſurrounding medium, ſuppoſing that the body is afterwards kept in a medium, the temperature of which was perfectly uniform, and of any degree of heat, the fever will go on perfectly. That if fever is produced by moiſture in the atmoſphere, it will go on if the patient is kept in a compleatly dry atmoſphere. That if fever is produced by putrid matter applied in any way to the body, the fever will go on if no putrid matter of any kind is contained in or applied to the body. Each of theſe poſitions ought to be demonſtrated by great numbers of particular inſtances adduced; but relating the obſervations that have been made by practitioners, as well as thoſe which have occurred in the author's own practice, would render this work much too voluminous.

The next point to be obſerved in the action of the cauſes of fever is ſtill newer. If a body be put in motion by any impelling power, and meets with no reſiſtance after having received the impulſe, it would continue its motion for ever with the ſame velocity in the ſame direction. But if the ſame impelling power ſhould be applied to it a ſecond time in the ſame direction, the velocity of its motion would be encreaſed in that direction, and every time this was repeated, the velocity of the motion in that direction would be conſtantly encreaſed, and if any other impelling power ſhould be applied in the ſame direction, the velocity and motion would alſo be encreaſed in the ſame direction. Therefore, in fever, if a cauſe was applied ſo as to produce fever by analogy, we ſhould expect that the ſame cauſe being again applied ſhould encreaſe the diſeaſe; or that any other cauſe of fever being applied ſhould alſo encreaſe the diſeaſe, and ſo it has always been taken by authors. As the author has already ſaid in the paper before alluded to, it occurred by accident in inoculating for the ſmall-pox, making a puncture one day that he was not ſure was ſufficient to produce the diſeaſe, a puncture was made in the ſame patient a day afterwards; each puncture produced an inflammation which came to ſuppuration. Although fever was produced when the firſt inflammation came to ſuppuration, when the ſecond came to ſuppuration, no encreaſe of fever took place; and it is farther obſerved in that paper, that the natural infection, as it is called, of the ſmall-pox, requires generally thirteen or fourteen days after it is applied to produce the diſeaſe, while, if the matter be applied to a wound, as it is in inoculation, the diſeaſe takes place in ſeven or eight days after the matter is applied. If, therefore, a perſon has caught the infection of the ſmall-pox in the natural way, that is, by the matter floating in the air being applied to ſome part of the body, if a wound be made two or three days afterwards, and variolous matter be applied, the fever will be produced in conſequence of the matter applied to the wound, and when the fever would have ariſen in conſequence of matter applied in in the natural method, no additional fever, if one was already preſent, will take place, nor will any fever come on if it has gone off. Since the cauſes of fever are frequently applied to perſons in health without producing the diſeaſe, a queſtion ariſes, whether in any given number of perſons affected with fever, and an equal number of perſons not affected with fever, any cauſe of fever ſhould be applied? whether in the perſons in perfect health that cauſe would produce fever more frequently than it would produce a new fever in thoſe who have been already affected with the diſeaſe, or would encreaſe the fever already exiſting? From analogy, in the common incidents of life, one would immediately conclude that ſuch cauſe of fever would more readily encreaſe one already exiſting, and would be equally, or more ready to produce a new one. But obſervation, not only in the infection of the ſmall-pox, but in other caſes, contradicts this idea. In order, however, to inveſtigate this point, two things are to be conſidered. In the firſt place, whether two fevers can be preſent at once? or whether one fever only? To thoſe who are converſant only with thoſe authors, who have written from their practice ſince the revival of ſcience in Europe, and have not grounded their arguments on the writings of the Greek phyſicians, which include likewiſe the Arabian, and a few Roman practitioners,

tioners. This may ſeem a queſtion not to be worth conſidering, yet the Greek authors who are extant deſcribe diſeaſes in moſt caſes with greater preciſion than the modern Europeans, and it was with them an univerſal and decided opinion, that two fevers might exiſt at once. The propoſition, therefore, to be recurred to is, whether a fever being once produced; a new cauſe, or a repetition of the ſame cauſe; is more likely to produce a ſecond fever; or an encreaſe of a fever already exiſting; than to produce a fever in a perſon in perfect health. In the ſmall-pox, new variolous matter applied after a fever has been already produced, will neither produce a new fever, nor encreaſe that which has taken place, and farther, when it has once produced fever, it is never capable of producing another. The author has applied variolous matter to wounds in himſelf, and many others who have once been affected with the fever produced by this cauſe, without any new fever being produced, although inflammation in the wound has taken place. The ſame is true, when fever has been produced by any other particular ſpecies of matter, has been applied any how to the body, ſo that inflammations have taken place on the ſkin, and matter has been formed, which, applied to a perſon who never has been afflicted with a ſimilar fever, followed by ſuch erruption, is capable of producing the diſeaſe.

When peculiar kinds of matter have been formed in the body (but not in conſequence of inflammations of the ſkin), capable of producing fever when applied to a man in health, ſuch matter, after having produced one fever, may produce a ſecond, third, or fourth in the ſame perſon; as, for example, when the common infectious matter produced in the bodies of all perſons affected with fever, has once produced the fever, the patient has gone through the diſeaſe and recovered. By a freſh application of the ſame ſpecies of infectious matter, a ſecond fever may be produced in the ſame perſon, as almoſt every practitioner who has ſeen a great number of patients, muſt have found from his experience. But in the firſt place, if that infectious matter which is produced in the bodies of all perſons afflicted with fever, has produced the diſeaſe; according to the author's obſervation; as well as that of many other authors, who have frequently ſeen the diſeaſe; the repeated application of ſuch infectious matter neither encreaſes the diſeaſe, nor brings on a new fever nearly ſo often as it originally produces a fever in a man in perfect health. Proof of this depends on this circumſtance. In hoſpitals, where perſons ill of other diſeaſes have a fever produced by ſuch infectious matter; when they remain in the ſame ward where they received the infection, and where they are conſtantly expoſed to it, during the progreſs of the diſeaſe, (it ariſing from ſeveral other patients, in the ſame ward,) go through the diſeaſe exactly with the ſame circumſtances as thoſe who have accidentally received the infection, and are in large rooms where they are expoſed to no other infectious vapours excepting thoſe which ariſe from themſelves.

Every practitioner converſant in fevers, that have taken place from infection, ſuch as is produced by fever, in the higher and lower ranks of life, will be perfectly convinced, upon reflection, that a fever taking place from infection in the moſt wealthy and nobleſt perſons in the country, and treated with all attention, with regard to infection, goes through its courſe in the ſame manner as in a patient in an hoſpital, where there are many others afflicted with the ſame diſeaſe, provided that attention is paid that there ſhall be an equal change of the air in the atmoſphere, and freedom from putrefaction.

It follows, therefore, that when matter which produces fever followed by cutaneous eruptions has once been applied to the body ſo as to produce the diſeaſe, a ſecond application of it will neither encreaſe the fever already produced, nor occaſion a new one. When matters of other kinds are applied to the body, ſo as to produce fever, a ſecond application ſeldom encreaſes the diſeaſe, and is leſs apt to reproduce it than it is in perſons never afflicted with the diſeaſe.

The ſame thing is alſo to be ſaid of the other cauſes of fever.

Since the application of the cauſe of fever is not neceſſary, for the continuance of the diſeaſe, the next thing to be enquired into is what happens farther in it.

The firſt attack of the diſeaſe may be fatal, in the firſt, or any ſubſequent paroxyſm.

When the firſt attack of fever has been fatal it has been claſſed among ſudden deaths, and all of theſe have been called very erroneouſly apoplexy or ſyncopy. When ſubſequent paroxyſms of the diſeaſe have been fatal, the expectation of the diſeaſe at a certain time has ſhown it to be fever. The appearances, however, are the ſame, both when the parent dies in the firſt or ſubſequent paroxyſms, viz. ſymptoms of depreſſion of ſtrength, contraction of the ſmall veſſels, and affection of the ſtomach.

When the attack is fatal it ſometimes kills in five minutes, ſometimes it requires half an hour, ſeldom longer than that time. While the patient is yet ſenſible, violent head-ach with great ſenſe of chillineſs take place, the extremities become very cold, and perfectly inſenſible; there is great proſtration of ſtrength, ſo that the patient is incapable of ſupporting himſelf in an erect poſture; he becomes pale, his ſkin of a dirty brown, and he is ſoon inſenſible to external objects; the eyes are half open, the cornea ſomewhat contracted. If the patient goes off very ſoon, the pulſe is diminiſhed, and at laſt loſt, without any frequency taking place, but if it be longer before he dies, the pulſe becomes exceſſively ſmall and frequent, all the appearances of life gradually ſubſide, and the patient is carried off. Of this, the author has ſeen inſtances, ſometimes at the firſt attack, oftener in the returns of the diſeaſe, although but very few; he believes them to be much more frequent in warm climates, where the moiſture of the country occaſions intermittents, than in colder regions.

Since, when the attack of fever cuts off the patient in eight or ten minutes, the pulſe does not become frequent, it would ſeem that this frequency was not a ſymptom neceſſary to conſtitute fever; for if a diſeaſe ſhould kill without a ſymptom, that ſymptom undoubtedly cannot be eſſential to the diſeaſe.

It is rare, however, that fever is fatal in its attack. It has been already ſhown, that its continuance does not depend upon its original cauſe, it muſt therefore have ſome progreſs of its own; either it muſt remain exactly in the ſame ſituation in which it was produced, or ſome variation muſt take place. It is true, indeed, that if the ſubject be taken up a priori, it would prima facie be concluded, that if a cauſe produced an effect, and was no longer applied, that that effect would continue preciſely the ſame. But this is not the caſe with the human body, there are powers in it which retard or repel thoſe variations that are produced by the cauſes of diſeaſe, and ſo it happens in fever. There are powers in the body, which, when the fever is once produced, repel it, and bring the patient back again to the healthy ſtate. It is very true, that what theſe operations are which repel fever is not known, as far as the author is able to judge, but the external appearances which take place during their operation are perfectly known. The author has, therefore, only to enumerate the appearances which take place during the time that the natural powers of the body are repelling the attack of a fever, from whatever cauſe it may ariſe.

The firſt of theſe is horror and rigor, in Engliſh ſhuddering and ſhaking, although the Latin words expreſs the ſenſe better. It is an obſervation the author heard from Dr. Cullen, which has been confirmed from his own experience and reading, that when in any paroxyſm of fever, rigor and horror take place, the patient is never carried off by the acceſſion of that paroxyſm. Many obſervations are however to be made with regard to theſe ſymptoms. They are very far from always taking place in every fever, ſo as to be ſenſible either to the patient or the bye-ſtanders, or to a practitioner well verſed in the diſeaſe. When they do take place they happen very commonly in the firſt acceſſion of a continued fever, not ſo frequently afterwards; they take place oftener in the ſubſequent acceſſions of intermittent fever; but is very far from being conſtant in them, although it be true, that when it does take place the patient is not deſtroyed in that paroxyſm by the fever itſelf, yet it is alſo true, that many patients eſcape during the acceſſion of a paroxyſm without any horror or rigor taking place.

It is next to be enquired to what part of the body this horror and rigor is to be aſcribed. Senſations are generally felt in that place where the cauſe of the ſenſation is applied, but this is by no means an univerſal rule; there are many ſenſations which are felt in parts of the body different from thoſe where the application is made, as pain is felt in the forehead, for example, when ſubſtances are introduced into the ſtomach which diſagree with it; it is therefore difficult to judge from whence this horror and rigor ariſes. The author's own feelings lead him to ſuppoſe, that they ariſe from affection of the ſtomach, he does not however mean to inſiſt upon this. As rigor and horror are ſometimes abſent, ſo they take place in various degrees. Sometimes the external parts of the body are much affected, and conſiderable motion takes place in them, and eſpecially in the extremities, in conſequence of alternate contraction and relaxation of the muſcles; ſometimes the other moving exterior parts of the body are put in motion; ſometimes, although all the external parts are at reſt, contractions and relaxation of the interior parts take place, which patients expreſs by ſaying they ſhake inwardly. In which ever of theſe ways it be, the patient is not carried off, after they begin, by that acceſſion.

When it is obſerved, that if rigor and horror take place the patient is free of danger from that acceſſion, it is not meant that he is free of danger from that paroxyſm, becauſe there are many dangers which may ariſe during a paroxyſm beſides that at the acceſſion; yet a patient is rarely if ever cut off in any way in a paroxyſm of fever, in which a conſiderable degree of horror and rigor have taken place, if it be in a ſimple fever.

Frequency of pulſe is not a neceſſary part of fever, ſince the diſeaſe can exiſt without it, and as an attack of fever may prove fatal to the patient without any frequency of the pulſe above its ordinary rate, it follows that this frequency of the pulſe is to be conſidered, not as an appearance of the attack of the diſeaſe neceſſary to conſtitute the acceſſion, and is therefore to be enumerated among the appearances of the ſecond ſtage. Not but that it happens often, when a patient is carried off by the firſt ſtage of fever, that his pulſe becomes much more frequent than its ordinary rate, ſometimes 140, 150, or 160 ſtrokes in a minute, or as frequent as can be counted. That, however, does not prevent the author from deeming frequency of the pulſe, an accident only in the firſt ſtage depending on the flow of blood upon the heart; it ſeems to be a more decided appearance of the ſecond ſtage, for a ſecond ſtage of a ſimple fever, or an intermittent, it is believed has never been ſeen without it; yet in continued fevers, the author has frequently ſeen all the other ſymptoms of the ſecond ſtage, without any frequency of the pulſation of the arteries above the common rate, which is 73 ſtrokes in a minute; and he has often ſeen it much below 73, when all the other ſymptoms of the ſecond ſtage were preſent in an high degree. He believes, however, that this is only that the heart is not affected with the diſeaſe, or rather that a greater degree of inſenſibility has taken place in it, than in the other parts of the ſyſtem, therefore frequency of the pulſe ſhould properly be enumerated among the appearances of the hot fit of fever.

The pulſations encreaſe as the hot fit comes on to 100 or more ſtrokes in a minute, and continue frequent during the whole of the hot fit, and often much fuller and ſtronger than in the firſt ſtage of the diſeaſe.

Along with this frequency of the pulſe a greater degree of heat takes place, but independent of it, becauſe it bears no proportion to the frequency of the pulſe. Sometimes when the pulſe is very frequent, the heat to the feel of the patient, to the thermometer, and to the practitioner, is leſs than the natural temperature. Sometimes the heat is greater, when the pulſe is by no means very frequent, full, or ſtrong.

The heat of the human body if taken by a ſmall Fahrenheit's thermometer under the tongue, with the mouth ſhut, is 97° and a half in a perſon in perfect health. It is the ſame, if an opportunity ſhould offer of examining it, in any of the interior parts of the body, ſeldom altering a degree, as long as a man remains in health, whatever temperature the external atmoſphere or ſurrounding bodies may be. How ſuch an exact temperature ſhould be maintained, it is not the object at preſent to diſcuſs.

The greateſt degree of heat the author ever obſerved in fever, and he has paid attention to this point, is 105°; he has ſeen in many authors much greater degrees, 110° and 112°, but never found in any fever either ſimple, continued, or intermittent, an higher degree than 105°. It varies very much in the hot fit of the paroxyſm of a ſimple and intermitting fever. During the hot fit, it is always above the natural temperature, although ſometimes not more than 100° or 102°. In the hot fit of the paroxyſms of continued fevers it falls ſometimes below the natural ſtandard. The heat by the thermometer in different parts of the body is very unequal in fever. It can be beſt obſerved under the tongue. In the extremities it can never be taken perfectly, unleſs there ſhould be a wound or ulcer into which the thermometer can be introduced; in that caſe the heat is nearly the ſame as under the tongue. But, in the hot fit, eſpecially at the beginning, it varies conſiderably in different parts of the body. In ſome parts it is 4 or 5 degrees below the natural ſtandard, while in other parts it is as many above it, although the whole body be equally defended from external expoſure to heat or cold; and although the circulation appears to be the ſame in the hotter and colder parts of the body. This happens only in the beginning of the hot fit after it has completely taken place, whether the fever be continued, remittent, or intermittent, or ſimple, the heat comes to be equal over the whole body, except that it cannot be perfectly meaſured in the extremities, unleſs there ſhould be a wound into which the thermometer can be introduced.

Although frequency of the pulſe and encreaſed heat are often found in the firſt ſtage of the fever, yet, it has been ſhown, that neither of them were eſſential to this ſtage, not even when it proved fatal. But both frequency in the pulſe, and greater heat are always found in the hot fit, or ſecond ſtage of a ſimple fever. It is, therefore obvious, that they conſtitute a principal part of this ſecond ſtage, which is evidently a natural cure or means of carrying off the firſt ſtage of the diſeaſe. This is eſpecially proved by the pulſe not only becoming more frequent, but likewiſe for the moſt part fuller and ſtronger in this ſecond ſtage or hot fit. This indicates a greater difference between the ſize of the ventricle of the heart, when dilated and contracted, therefore a more extenſive contraction of it; and likewiſe that it exerts itſelf with greater energy, or in other words contracts with greater force, ſo as to throw a larger quantity of blood into the aorta at each contraction, and to throw it in with greater force, and encreaſe the circulation throughout the whole ſyſtem. For certainly, if there be a greater difference between the contracted and relaxed ſtate of the ventricle, ſo that more blood is thrown into the aorta at each contraction, and the contractions are more numerous, a larger quantity of blood muſt circulate through the whole body. It is true, indeed, that when it paſſes from the aorta, it may not circulate through every branch of it, and every capillary veſſel with greater velocity; but it muſt paſs through ſome of its branches, and ſome of the capillaries with greater velocity. If ſome of the capillaries, and ſome of the branches of the aorta are contracted, then it muſt paſs through the others with ſtill an additional velocity, in conſequence meet with a greater reſiſtance, which will force it to attempt to paſs through thoſe veſſels which are contracted with greater force. Since then a number of the veſſels are evidently contracted in the firſt ſtage of the diſeaſe, this would render the ſolution of the effects of the hot fit, or ſecond ſtage, in carrying off fever eaſy, for it would reſolve itſelf into this; that the ſmall veſſels being contracted throughout the ſyſtem, propel a large quantity of blood upon the heart, which ſtimulates the heart to make ſtronger exertions, and ſo throw the blood with greater force into theſe contracted ſmall veſſels, force them open, and thus carry off the diſeaſe. And ſuch has been the ſolution given by thoſe who have precluded any alteration in the fluids from being the cauſe of the diſeaſe.

That the fluids are altered by the hot fit of a ſimple fever, is a point to be determined only by experiment. But no alteration in them has ever been ſhown in any fever, much leſs in a ſimple one, which continues only 8, 10, or 12 hours. On the other hand, it does not require any preciſe time to produce an alteration in the chemical properties of the fluids; it may take place inſtantaneouſly, much more may it happen in two or three hours. But the poſſibility of ſuch alteration of the properties of the fluids by no means proves that it has actually taken place, any more than the poſſibility of its not happening proves that it has not taken place.

Upon examining blood carefully taken in the firſt ſtage of fever, and blood taken in the ſecond, or even in the criſis, the author in many inſtances has found no ſenſible difference. The ſpontaneous ſeparation of the blood by which the coagulable lymph ſeparates from its water, and the ſerum, entangling the red particles at the ſame time, ſo as to form a coagulum, has been found exactly the ſame in all the ſtages, the red particles the ſame in all the ſenſible qualities, in as far as could be examined by any chemical proceſs. The coagulum of the cogulable lymph being likewiſe the ſame, the ſerum the ſame, the ſuperfluous water, putreſcent mucilage and ſalts contained likewiſe the ſame. It is uſeleſs to detail theſe experiments, as they are only negative proof that in many caſes the fluids are not altered by the hot fit of a ſimple fever. In other caſes alterations have taken place, but not in ſimple fevers, as will be mentioned afterwards, yet more frequently there is no ſenſible alteration whatever.

It has indeed been ſaid that the fluids were attenuated, and a thouſand things beſides, the dreams of ſpeculatiſts, not confirmed by one experiment, and as ſuch to be entirely rejected.

Until then it is otherwiſe proved, which there is no reaſon to imagine it will be, after the attention which has already been paid to the properties of the fluids in fever without diſcovering any alteration in them; it is concluded that the hot fit makes no alteration in the fluids.

It is next to be conſidered whether this greater action of the heart, propelling the blood with additional force into the ſmall veſſels, really removes the contraction, and ſo carries off the diſeaſe.

There are two diſtinct parts in the attack of fever; contraction of the ſmall veſſels, and depreſſion of the powers of the body. Theſe two are not in proportion to one another, but ſometimes when there is a great degree of contraction, there is very little depreſſion of the powers of the body, and depreſſion of ſtrength is not neceſſarily attended with greater contraction of the ſmall veſſels. There is alſo affection of the ſtomach, apparently independent of the other external appearances, which contraction, depreſſion, and affection of the ſtomach together, are poſſibly no more than the exterior indications of ſome other alteration, of which no probable conjecture has hitherto been formed. If contraction of the veſſels is one of theſe appearances only, it occaſions ſome heſitation in allowing that removing it, or as it has been called by ſome taking off the ſpaſm, would cure the diſeaſe.

It is firſt to be conſidered whether the diſeaſe is carried off in proportion to this ſtrong action of the heart; for here a diſtinction muſt be made, without which great error may be fallen into. Fullneſs and ſtrength of the pulſe, which frequently take place in the hot fit of fevers, as well as in other diſeaſes, has often been called hardneſs, as has already been obſerved of the obſtruction. Hardneſs of the pulſe is undoubtedly a feel of action in the arteries, and not in the heart; it may exiſt with a ſmall pulſe when the ventricle throws out a ſmall quantity of blood at each contraction, with a weak pulſe, as in hectic caſes near their end; when the pulſe is ſlow, as in chronic rheumatiſm; therefore does not at all depend upon the action of the heart; and it has this concomitant ſymptom, that it produces in the blood a diſpoſition to remain fluid after extravaſation, ſo that the red particles ſhall fall from the ſurface before any coagulation takes place, and the upper part ſhall conſiſt of coagulated coagulable lymph, forming what is commonly called a buff upon the blood. This takes place not unfrequently in a paroxyſm of ſimple fever, but is not neceſſary, or even common. When it does, it always gives a great diſpoſition to prolong the paroxyſm, and convert it into a compound fever. This appearance then muſt at preſent be entirely laid aſide.

It is ſo obvious to ſuppoſe, that the ſtrong action of the heart propelling a great quantity of blood with force into the ſmall veſſels is that part of the hot fit, which carries off the diſeaſe; that this opinion has on firſt view been univerſally adopted, and in all the rude ages of medicine ſtimulants have been conſtantly employed to encreaſe this action of the heart, ſo as to ſhorten the paroxyſms, produce criſis, and render them ſimple fevers. But on the contrary, when the art has been more refined as by Sydenham in our country; theſe ſtimulants have been rejected, as tending to prolong what would otherwiſe be a ſimple fever, and converting it into a compound one. It may be affirmed, therefore, that although in rude ages the idea has been formed, that the greater exertion of the heart is the natural cure of the diſeaſe; yet when practitioners became more converſant in it, the opinion was entirely thrown aſide. Many practitioners who have not conſidered the ſubject maturely ſtill retain this notion, certainly erroneous.

It muſt be owned, however, that although the encreaſed action of the heart produced by ſpices, wine, and other ſtimulants, very often prolongs the paroxyſm, and converts a ſimple into a compound fever ; nevertheleſs, ſometimes it has happened, that on exhibiting theſe ſtimulants a paroxyſm has been ſooner, and more perfectly carried off, but this is ſo ſeldom, not once in fifty times, and on the other hand the paroxyſm has been ſo frequently prolonged by them, that they do not ſeem of ſuch utility, as to authoriſe our employing them in practice.

However the increaſed action of the heart is certainly greater in ſimple than in compound fevers, in intermittents whoſe paroxyſms are ſhorter (and the encreaſe of action of the heart, by means of ſtimulants, now and then makes them ſtill ſhorter) than in a continued fever, ſo that it can be hardly doubted, that the encreaſed action of the heart is one means of the cure of the firſt ſtage, although far from the only one.

Other means are therefore to be ſought, and the next which offers is ſome action of the ſtomach.

It frequently happens that ſickneſs takes place in a ſimple fever, not in the attack, but in the beginning of the hot fit. Some have imagined that this had ſuch an effect as to co-operate with the ſtrong action of the heart, ſo as to carry off the diſeaſe. They have been led to this more particularly by obſerving, that certain remedies exhibited, which ſometimes produce ſickneſs, do frequently bring on a criſis ſooner or more perfectly; ſuch medicines, for inſtance, as tartariſed antimony, and ipecacuanha. But there are many ſimple fevers in which no ſickneſs ever takes place, and yet they terminate as perfectly, and the criſis is as complete as in other caſes where ſickneſs does take place; ſickneſs therefore cannot be conſidered as a cauſe exiſting in the hot fit which carries off the diſeaſe.

Medicines, ſuch as tartarized antimony, and ipecacuanha, which certainly have a tendency to bring on a criſis, and render that criſis more perfect, frequently, while they do ſo, produce no ſickneſs. When a large doſe of theſe medicines can be borne upon the ſtomach, without occaſioning nauſea, they are more efficacious in rendering the paroxyſm ſhorter, and converting the fever into a ſimple one, than when the ſtomach will bear but a ſmall quantity without producing nauſea; in this caſe, indeed, they rarely have any effect.

It is farther to be obſerved, that there are ſeveral other medicines which produce ſickneſs in as violent a degree, ſuch as ſquills, which, in whatever doſe they are exhibited, have no effect in bringing on criſis in fever.

Upon the whole, therefore, it ſeems evident that ſickneſs does not tend to carry off the diſeaſe, but that the ſickneſs is only a concomitant effect of that action of the ſtomach, which either naturally produces a criſis, or is excited by the action of certain remedies.

A patient not being carried off by the firſt ſtage of a ſimple fever after horror and rigor have taken place, which ſeem to ariſe evidently from affection of the ſtomach. Loſs of appetite likewiſe, and ſometimes nauſea appearing at the beginning of the hot fit, affords ſuſpicion, that ſome affection of the ſtomach, produced in the firſt ſtage, has a power likewiſe of carrying off the contraction of the ſmall veſſels, and the inaction of the powers of the body throughout the ſyſtem, or the cauſe on which theſe external appearances depend. For the ſtomach has very great influence on the other parts of the ſyſtem, as appears from the effect of many medicines which have their operation entirely on the ſtomach before they can reach any other part. Spices, ſuch as nutmeg, cinnamon, &c. produce a glow of heat over the whole ſyſtem the moment they are received into the ſtomach, when they have been thrown into it ſix or eight hours their effects are entirely gone off, and inſtead of a ſtimulus, languor ſucceeds. It is well know, that the effects of ſpices depend entirely on the eſſential oil they contain; this is far from being volatile, and has no chance, therefore, of evacuation out of the body by evaporation in that time, and it often happens that no other takes place. They cannot, therefore, have their operation in the blood-veſſels, or any of the ſecretory organs. It has been ſuppoſed that the nerves of the ſtomach took them up, carried them to the brain, and from thence to the other parts of the body, but without the ſmalleſt proof of any kind whatever. It remains, therefore, that the whole of their operation is on the ſtomach. Opium likewiſe, by its operation on the ſtomach, affects the whole ſyſtem, for it is not ſwallowed five minutes, in many caſes, before the effects of it begin to be felt, and they are entirely gone off in eight or ten hours, although there be no reaſon to believe that any part of it has gone out of the ſyſtem. Perhaps being diluted with the whole maſs of fluids, it no longer produces any effect, while, if applied in a more concentrated ſtate to the other parts of the body, it would certainly have conſiderable action. Peruvian bark, exhibited in ſubſtance, to the quantity of half an ounce, or an ounce, juſt before the attack of the paroxyſm of an intermittent fever, the time of which is known, will, in many inſtances, prevent that paroxyſm from taking place. The effect, therefore, muſt be on the ſtomach, for there is not time for it in this ſpace to be diſſolved, and carried into the blood-veſſels, it cannot get into the blood-veſſels in the form of a powder, if it be exhibited already diſſolved in water, or any other menſtrum, it is not nearly ſo efficacious as when employed in powder, the whole of its effect in this caſe muſt be on the ſtomach.

It is ſufficient to have enumerated the effects of theſe medicines to ſhow that the ſtomach has great influence over the other parts of the ſyſtem; it is, however, by no means meant that the action of all medicines are entirely, or principally on the ſtomach. Mercury, for inſtance, may be exhibited ſo as to affect the ſtomach, and produce ſickneſs, but in conſequence of this affection of the ſtomach none of its other powers are exerted. In order that they ſhould be, it is neceſſary that it ſhould be abſorbed, and carried into the courſe of circulation. For it will equally produce its other effects if it be abſorbed from the ſkin, or any other part of the body. All that is intended to be ſhown is, that affection of the ſtomach has very great power over the reſt of the ſyſtem, and very probably co-operates with the encreaſed action of the heart in carrying of the contraction of the ſmall veſſels, and inaction of the powers of the body, or the more unknown alteration from the natural ſtate of the ſyſtem on which theſe depend.

This encreaſed action of the heart, and affection of the ſtomach, may be the only efficient powers which take place in the hot fit of fevers, or there may be others with which we are totally unacquainted.

In inveſtigating the effects brought on by the hot fit, we muſt ſelect thoſe appearances which take place in a fever, conſiſting of one paroxyſm only, and which is terminated in eight, ten, or twelve hours, for there are many which happen in compound that do not appear in ſimple fevers.

The firſt that ſhall be taken notice of is fullneſs and ſtrength of the pulſe added to its frequency, which in many inſtances, is very much encreaſed above that which ariſes in, and is a part of the firſt ſtage of the diſeaſe. It is often much more frequent in a ſimple fever than in the paroxyſms of intermittents, and ſtill more ſo in paroxyſms of intermittents than in continued fevers. In ſimple fevers, it is not uncommonly 140 or 150 ſtrokes in a minute, full, ſtrong, and very much obſtructed. In the paroxyſms of intermittents and continued fevers, not unfrequently hard at the ſame time. But this ſeldom happens in the hot fit of a ſimple fever. Some authors have miſtaken the obſtruction of the pulſe for hardneſs. Sometimes the diſeaſe terminates in topical inflammation without any criſis happening, as is hereafter to be deſcribed, in which caſe, although the pulſe be hard, the fever cannot be conſidered as ſimple.

The circulation is, therefore, univerſally encreaſed, although unequally. In ſome of the ſmall veſſels in every part of the body, it is encreaſed, ſo as to produce redneſs and fullneſs of all the parts, and an encreaſed ſize of the veins. But then many of the ſmall veſſels in every part remain contracted; as may be gathered from the exterior parts, although they have a degree of redneſs, ſtill retaining that dirty reddiſh brown; from the contracted ſtate of the ſecretory organs, and thence the diminution of the ſecretions, which ſtill continues; and the dryneſs of the ſkin and tongue. It appears from theſe ſufficiently evident, that although ſome of the ſmall veſſels are ſo far enlarged as to let more blood paſs through them, yet others remain ſtill contracted. The circulation, therefore, is encreaſed by the ſtrong, and more frequent action of the heart, and greater difference between the contracted and relaxed ſtate of the ventricle propelling the blood forward through ſome of the veſſels, while others remain contracted.

At the beginning of the hot fit, and before it is perfectly formed, the circulation is variouſly affected in different parts of the body, that is, the circulation is evidently greater in one particular part. It frequently happens that one part ſhall become red and full, while others remain pale and contracted; one arm, for inſtance, ſhall be red and larger, while the other is pale and contracted. The veins of the one ſhall be full, and the blood flow in them more rapidly, while thoſe in the other remain empty. This ſhall continue for a certain length of time, when that part which was red and full, and the veins diſtended, ſhall become contracted, pale, the veins contracted, and empty, while that which was pale, its veins contracted and empty before, ſhall become full, red, and it veins diſtended. This ſhifting, however, remains but a ſhort time in ſimple fever, perhaps not above half an hour. In paroxyſms of intermittents, it continues longer, and ſtill longer in the firſt attack of continued fevers. Univerſal redneſs at length takes place in all caſes of ſimple fever; together with fullneſs, encreaſed ſize of, and greater circulation through the veins; accompanied however, with appearances of contraction.

The heat is frequently much greater in the cold fit, or firſt ſtage, than in the natural ſtate of the body. Even when the patient feels himſelf very cold, the heat often ariſes to as great a degree as it ever does in fever. When the ſecond ſtage comes on the patient begins to feel himſelf hotter, but unequally; ſometimes one extremity is felt cold by the patient, the other extremity hot; ſometimes the extremities feel cold, when the patient feels the parts about the thorax very hot. But this inequality ſubſiſts the leaſt, and for the ſhorteſt duration in a ſimple fever. The heat is more unequal in the paroxyſm of intermittents, and frequently much more in the firſt attack of continued fevers. The heat over the whole body in a ſimple fever ſeems intenſe to the patient, yet upon application of the thermometer, it is often found even leſs than it was when the patient felt himſelf cold. When the patient has felt himſelf univerſally cold, it has frequently been found 105° under the tongue, but when he felt himſelf extremely hot it has been reduced to 102° or 103. It is difficult in theſe caſes to believe the thermometer a perfect meaſure of heat, did we not know that ſenſation of heat is extremely fallacious, while we have no reaſon to doubt that the different expanſions of mercury and glaſs are uniform in ſhewing the variation of temperature, as they are always the ſame in every fixed point of heat; ſuch as in the boiling of fluids under the ſame degree of preſſure, the becoming fluid of ſolids, &c. Notwithſtanding, therefore, that the patient feels himſelf exceſſively hot in the hot fit of a ſimple fever, yet he is really not more ſo than he was in the cold fit, frequently not even ſo hot.

There is conſiderable thirſt in the beginning of the firſt ſtage of a ſimple fever, which is greatly augmented in the ſecond ſtage. It is difficult to account for this augmentation. The tongue is not now drier, nor the mouth more affected with the diſeaſe. Perhaps, the exertion of the powers of the heart, which we have conſidered as one of the operations tending to carry off the diſeaſe, may poſſibly create thirſt. There is as yet no evacuation by which the proportion of water can be diminiſhed in the blood-veſſels. Perhaps it may be the ſuperior ſenſation of heat, although not accompanied by actual heat, that may occaſion this ſuperior ſenſation of thirſt, but this cannot be determined.

The patient is ſometimes ſo much depreſſed in the attack of ſimple fever as not to feel any degree of reſtleſſneſs, but at other times a conſiderable degree takes place; it never fails to come on moſt violently in the ſecond ſtage. If it did take place in the firſt attack, it is very much encreaſed during the ſecond ſtage. The patient feels the time gone through infinitely long; a minute ſeems to him more than an hour; he cannot fix his attention on any object, he does not lie eaſy, and finds no relief in changing his poſture. It is difficult likewiſe to ſay, from what cauſe this takes place. It is certainly different from that anxiety and oppreſſion which ariſes about the præcordia in the firſt ſtage of the diſeaſe.

There are two apparent cauſes of reſtleſſneſs and anxiety in the ſyſtem. One, an accumulation of blood in the lungs, in the auricles of the heart, and in the veins leading to them. The ventricles of the heart can never be ſaid to be oppreſſed with blood, ſince there is a period in each of their contractions in which the valve, which is ſituated between the ventricle and auricle, is ſhut, no blood can be thrown into the ventricles during the time of their contraction, while they are clearing themſelves by propelling the blood into the aorta, or pulmonary artery. In the auricles, there is no ſuch proviſion, but the blood is preſſing into them, even during the time of their contraction, and gives reſiſtance to it. The veins near the heart, if the blood be thrown upon them by the contraction of the veins in the other parts of the body, and the auricles are not capable of conveying it away, but muſt be diſtended. This produces, evidently anxiety and reſtleſſneſs. Or reſtleſſneſs may ariſe in the firſt ſtage from univerſal contraction of the ſmall veſſels, and may continue in the ſecond from the contraction remaining. In the ſecond ſtage, the encreaſe of circulation, from the ſtronger action of the heart through ſuch veſſels as become of larger diameter, may add to the diſtenſion of the larger veins near the heart. The ventricles, being more dilated in the time of the dilatation, more contracted in the time of their contraction, as appears from the pulſation of the arteries being much greater, and fuller, may, on the contrary, take off the additional quantity of blood, ſo that, perhaps, the whole anxiety remaining from this cauſe may not be greater in the hot fit than it was in the firſt ſtage.

Another cauſe of reſtleſſneſs and uneaſineſs may ariſe from diſtenſion of the ſmall veſſels throughout the ſyſtem. This produces uneaſineſs over the whole body, accompanied with anxiety, reſtleſſneſs, and the ſame idea of the prolongation of time. The author however, would not be confident that this was entirely the cauſe of reſtleſſneſs in the hot fit of ſimple fevers; eſpecially at its commencement. There are various cauſes which may produce it; as many affections of the mind independant of the diſeaſed ſtate of the body; therefore, foreign to the preſent ſubject. Not but that the mind is affected in fever as well as the body, but this has been conſidered as part of the firſt ſtage.

There are many diſeaſes in which independant of accumulation of blood, in the large veins near the heart, and tenſion of the ſmall veſſels throughout the ſyſtem, reſtleſſneſs, uneaſineſs, and the idea of the prolongation of time, may be produced. If, for inſtance, ſubſtances get into the ſtomach which diſturb it, without producing ſickneſs or nauſea, the ſame ſenſation frequently takes place. When ſubſtances get into the ſtomach, which are diſagreeable to it, the firſt operation that happens is, that the ſmall veſſels throughout the ſyſtem are contracted, as appears from the univerſal paleneſs which takes place. The blood is thrown in large quantity upon the lungs, veins near the heart, and its auricles occaſioning a ſenſe of weight and anxiety: this may be ſaid to be owing to the fulneſs of the veins near the heart and in its auricles. After this paleneſs, univerſal heat, ſtrength, and frequency of the pulſe, ſwelling every where, cutaneous eruption, inflammation of the head, great tenſion of the ſyſtem, and uneaſineſs, which might be aſcribed to the tenſion, take place. But there are many ſubſtances, ſuch as food of high flavour, and producing viſcid ſolution, which, without cauſing a paleneſs, nauſea, tenſion, &c. will, if eaten in too great quantity, or if thrown into a ſtomach not ſufficiently powerful for their digeſtion, occaſion the ſame ſenſe of uneaſineſs, reſtleſſneſs, and the idea of the prolongation of time. There may, therefore, be affection of the ſtomach, independant of ſickneſs or nauſea, and independant of any tenſion, which may occaſion reſtleſſneſs, uneaſineſs, and idea of prolongation of time. It is not impoſſible,

ſince

ſince the ſtomach is affected in fever, that it may be owing to this affection that theſe appearances take place.

Delirium may take place in the firſt ſtage of fever, and in conſequence of either the depreſſion of ſtrength in the body, or in the mind, or contraction of the veſſels of the brain. Delirium may alſo take place in conſequence of the ſecond ſtage of the diſeaſe, and that in a ſimple fever. This delirium happens much more frequently in a ſimple fever than it does in the paroxyſms of intermittents. The delirium that takes place in the ſecond ſtage, would appear to depend entirely on the encreaſed action of the heart; the pulſe becoming very full, ſtrong and frequent, there ariſes pain in the head, diſſimilar from the pain which took place in the firſt ſtage. That which took place in the firſt ſtage is clearly a pain affecting the integuments of the head, perhaps the ſkin alone, at moſt the pericranium; but the pain which ariſes in the ſecond ſtage, is felt by the patient internally, and gives him the idea that there is ſomething diſtending the head or the brain, ſo as to attempt to burſt the cranium. It is not more, nor often ſo violent as the pain taking place from the firſt ſtage of the diſeaſe. The delirium it produces, while it remains, is conſiderable; that is, the patient often miſtakes one object for another, although the organs of ſenſation make ſtill an impreſſion on his mind. He can ſee, for example, but miſtakes one man for another, or for a poſt. His organs of hearing are often more readily affected, but not with the ideas that would be produced by the ſame ſounds were he in health. The ſame thing happens with regard to his other ſenſes.

In the mean time, the carotid and temporal arteries beat full and ſtrong, the eyes are rather red, and the face fluſhed; there is, therefore, reaſon to believe that this delirium ariſes from compreſſion of the brain by the quantity of blood thrown up into it by the encreaſed action of the heat.

This delirium, if unaccompanied with hardneſs of the pulſe, by no means retards the criſis. But if hardneſs of the pulſe, independant of obſtruction, ſhould take place, it often converts the diſeaſe into a compound fever.

With theſe ſymptoms, as far as they are compatible with them, all the appearances which take place in the firſt ſtage of fever continue. Some, however, are incompatible; the pulſe cannot be full and ſtrong, and ſmall at the ſame time, for inſtance. Otherwiſe the pain in the forehead, depreſſion of ſtrength, foulneſs of the tongue, and contraction of the ſecretory organs, &c. all continue.

Fevers generally differ from one another in the duration of the hot fit. A fever which has been called an ephemera, as laſting a day and a night, although deſcribed by Greek phyſicians as attended with as violent ſymptoms as any fever, yet by modern practitioners a diſeaſe under this name has generally been attributed to exceſs. Such as drinking too large quantities of wine; or the application of ſome other ſuch ſtimulus, which occaſions a frequency of pulſe and heat, for a certain length of time, this affection does not in any way reſemble a fever, there being none of the other ſymptoms of that diſeaſe.

A ſimple fever, ſuch as the author is deſcribing, does not often laſt a day and a night, but is often terminated in eight, ten, or twelve hours; the diſeaſe going off does not return again, and then may be conſidered as perfectly ſimple; or it does return again, and forms a compound fever, the hiſtory of which will be ſhown in a future diſſertation.

Nevertheleſs, the hot fit in ſimple fever may remain for a much longer time, may continue two days, or even run into the third, without any freſh exacerbation, and may be carried off. This happens from the prolongation of the ſecond ſtage, but this is extremely rare.

Much more frequently in ſimple fevers, the firſt ſtage does not continue above two hours, the ſecond ſtage rarely continues afterwards for more than two or three hours before the criſis begins to take place. It frequently happens that it continues a much leſs time when the diſeaſe is not terminated by a criſis, but by an inflammation, or an hæmorrhage.

The firſt manner in which a ſimple fever terminates, has been called a criſis. Rome and Italy having acquired their ſcience from Greece, were exceedingly apt to adopt Greek phraſes, more particularly in medicine, becauſe almoſt all the phyſicians among the Romans were Greeks. But the terms were employed very vaguely. Criſis, for example, was uſed for any termination of any diſeaſe, good or bad. Among the moderns, there is nothing ſo prejudicial to medicine as the introduction of Greek names, eſpecially as they have been adopted by numbers who do not underſtand one word of the language. When the term criſis is made uſe of in the preſent work, it always means the going off of the firſt ſtage of fever in the manner here deſcribed.

The hot fit having continued a certain time is the occaſion apparently of the criſis, either by means of the encreaſed action of the heart and arteries; the affection of the ſtomach; or both taken together; or, perhaps, by ſome other operation which has not as yet been diſcovered. Sometimes one of the ſymptoms of the firſt ſtage gives way firſt; ſometimes another; ſo that it cannot be ſaid which has the priority. When the ſymptoms of the firſt ſtage are carried off, thoſe of the ſecond ſtage go off of courſe, being produced by thoſe of the firſt. So that if the firſt ſtage had never taken place, the ſecond would never have come on. Nor does the ſecond ſtage continue like the firſt independant of its cauſe, but leaves the patient as ſoon as its cauſe is removed.

It is the ſymptoms of the firſt ſtage that firſt apparently give way. Sometimes the great ſenſe of weight about the præcordia, ſometimes the obſtruction of the pulſe, ſometimes relaxation of the ſecretory veſſels takes place, &c. but the moſt ſtriking appearance to the patient and by-ſtander, is relaxation of the veſſels of the ſkin, in conſequence of which profuſe ſweating takes place, which has been ſuppoſed by many eminent practitioners, to be an evacuation of ſomething noxious to the ſyſtem, and which was the cauſe of the diſeaſe.

It is difficult to procure a quantity of the fluid, ſo ſecreted, ſufficient to determine its qualities; ſome may be procured by taking it off from the ſkin by a ſpoon, or by waſhing the linen in diſtilled water. By the firſt method it is difficult to procure more than two or three ounces, in moſt caſes hardly one. It is a fluid not perfectly tranſparent; its want of tranſparency depends on an oily matter, which, on ſtanding in a cloſe phial, ariſes to the ſurface, and conſiſts partly of expreſſed oil, partly of the oil which gives the peculiar ſmell to the body. In both theſe reſpects it agrees with the oily matter commonly ſecreted in the ſweat of a man in health. After this oil has riſen to the top ſo that the water becomes tranſparent, on evaporating it, a mucilaginous matter is found; if the heat employed for the evaporation be under 150°, it is nearly colourleſs, and perfectly ſoluble in water again; with a greater degree of heat it acquires a browniſh colour.

Along with this mucilaginous matter, ſaline ſubſtances are found, but in ſuch ſmall quantity, when the ſweat is taken from the ſkin, by a ſpoon that it can hardly be determined what they are. When taken from the linen of a patient waſhed in diſtilled water, filtered and evaporated, natron muriatum, ammonia muriata, and ammonia phoſphorata are found. All theſe ſubſtances are found in ſweat excited in a healthy body, ſo that in as far as can be judged from experiment, there is nothing in the matter evacuated by ſweating which is not found in health. It is poſſible, indeed, that ſomething may eſcape chemical experiment, but it muſt never be preſumed that there is. Too often a poſſibility of ſubſtances or circumſtances exiſting, that the niceſt ſcrutiny could not detect, has been deemed a ſufficient proof that ſuch circumſtances or ſubſtances did actually exiſt; a proof, and not a poſſibility, is always neceſſary to induce the ſmalleſt belief of their preſence. There is, therefore, the higheſt probability that there is nothing in this evacuation different from the ſweating that takes place in a perſon in health, and that it ariſes merely from relaxation of the veſſels of the ſkin.

Although profuſe ſweating moſt commonly takes place in the going off of a ſimple paroxyſm of fever, by criſis, there is ſometimes only a gentle moiſture on the ſkin which is at the ſame time relaxed. The ſkin returns likewiſe to its natural colour, but this happens only towards the end of the criſis, or we ſhould rather ſay, that the true ſkin receives its natural florid colour from the blood circulating through the ſmall veſſels, and overcomes the colouring membrane of the ſkin, and the colour of the ſebacious matter. Indeed there appears to be more colour in the firſt ſtage of fever, from the ſebacious matter of the glands, and the colouring membrane of the ſkin, than in the natural ſtate, and that this was part of the diſeaſe; but this colour will be more concentrated in conſequence of the contraction of the ſkin, ſince the ſebacious glands will be brought nearer to one another, and likewiſe the different parts of the colouring membrane of the ſkin, ſo as to give, as it were, a deeper tint. When the contraction of the ſkin goes off, this colour goes off likewiſe; but this never happens at firſt, whether there be much or little evacuation by ſweating, but towards the end of the criſis, or when it has compleatly taken place.

The evacuation by ſweating takes place very profuſely in the greateſt number of ſimple fevers for ſeveral hours. But as in ſome it is but trifling, it would not ſeem a neceſſary means of carrying off fever. Probably it is merely accidental, and in conſequence of the relaxation of the ſkin, and continued ſtrong action of the heart; it is to be remarked, however, that no ſimple fever is compleatly carried off by criſis, without ſome degree of moiſture of the ſkin.

The urine is alſo ſecreted commonly in larger quantity in the criſis of fever; but what is moſt remarkable in it is, that if it be collected in ſufficient quantity, and let ſtand for ſome time, it becomes turbid, and flaky chryſtals are depoſited of a dirty red colour. This depoſition almoſt always takes place on the going off of a ſimple fever by criſis, and that even when the febrile appearances have been very ſlight, often when it was only an encreaſe of the natural evening paroxyſm of fever. This matter ſeems conſtantly to be contained in the urine, even in health, with different appearances. The urine, when firſt evacuated, is perfectly tranſparent, and, what is commonly called in liquors, bright, remaining ſo while it ſtands in the heat of the human body. We are unacquainted with the ſtate of it in thoſe climates where the heat of the atmoſphere is equal to that of the body. If this matter has ſeparated from it by ſtanding, it re-diſſolves on being heated, provided no evaporation has taken place.

Theſe dirty, red coloured, flaky chryſtals appear conſtantly, in as far as the author knows, in that criſis of a ſimple fever, which entirely carries off the diſeaſe; if they were wanting, he would hardly heſitate to ſay, that it was not a paroxyſm of ſimple fever, but that the fever would be repeated, although all the other ſymptoms denoted a pera perfect criſis. The appearance of theſe flaky chryſtallizations ſeldom takes place towards the beginning of the criſis, but generally after the ſweating has continued ſometime. The matter of theſe chryſtals has been conſidered by many authors as the matter that occaſioned the diſeaſe, changed and made fit for evacuation, but that it is not, will appear from many conſiderations. In the firſt place it is always preſent in health, only not in ſuch quantities as to chryſtallize in flaky chryſtals, and that at all times in the twenty-four hours. The quantity, indeed, in health is ſo ſmall as to be hardly weighable, but then when it is copious, if ſeparated from the other parts of the fluid by filtration, and dried; it hardly ever weighs ſo much as five grains, if we take it from all the urine ſecreted in twenty-four hours. From the quantity, it hardly can be ſuppoſed that it could produce any great variation in the ſyſtem, much leſs ſuch a diſeaſe as fever. It not only makes its appearance in the criſis of fever, but likewiſe in many other diſeaſes, both of the ſyſtem generally and of particular parts, and frequently in diſeaſes where no frequency of the pulſe, nor any derangement whatever of the ſyſtem generally, nor any particular affection of the organs of ſecretion takes place. The appearance of this ſubſtance, therefore, muſt be conſidered as not at all eſſential, but only accidental, perhaps from relaxation of the organs of ſecretion, although its appearance is of great importance in determining the criſis, not only of ſimple but of compound fevers.

The mouth and tongue, which were dry in the attack, become moiſt during the criſis, and the tongue becomes clean. The tongue has been deſcribed as covered with a particular kind of cruſt, which adhered to it as part of itſelf. In the criſis the cruſt falls off in a ſurpriſing manner. It is known that when any part of the body dies, or is killed by any means, a proceſs immediately takes place, by which that part of the fibres where the living and dead were mechanically united, is converted into a fluid; in conſequence the dead and living parts are ſeparated from one another, and the dead parts of courſe, if they were on any external ſurface of the body, or on the ſurface of any cavity that opens externally, are thrown off. It is true, indeed, that Mr. Hunter and ſome other pathologiſts have held an opinion, that the abſorbents took up this part of the fibres; but it is impoſſible that an abſorbent ſhould take up part of a fibre, unleſs its continuity had been previouſly broken by ſome mechanical or chemical means. There is no mechanical power in the orifice of an abſorbent veſſel that can break the continuity of a fibre; it muſt be broken by the converſion of it, by ſome chemical means, into a fluid.

It is by a ſimilar operation, that the cruſt which was formed on the tongue in a ſimple fever is thrown off, for the cruſt adheres to the ſurface as part of itſelf. This ſeparation is much more conſpicuous in the criſis of a ſimple fever, than in any other caſe, for the whole takes place in an hour or two, ſo as to leave the tongue compleatly clean. The edges of the tongue firſt become moiſt, but that is where the cruſt did not cover it, and their moiſture is in common with that of the reſt of the mouth.

The cruſt itſelf comes off in ſmall flakes every where over the ſurface, leaving at firſt ſpecks, as it were, where the tongue becomes clean, and others, where the cruſt ſtill remains, until at laſt the whole ſurface of the tongue is entirely in its natural ſtate.

When a dead part is exfoliated from a living part, it leaves the ſurface of the living part in many caſes, in a ſtate of exulceration; in ſome caſes, however, it is left in its natural ſtate; as, for inſtance, when thoſe ſloughs which are formed in the eryſipelatous ſore throat are exfoliated, an indentation remains in the ſurface of the membrane; but in this hollow the membrane is perfectly ſound, the hollow gradually riſes up, and is obliterated. The ſurface of the tongue is perfectly ſound when the cruſt is exfoliated in a ſimple fever, it is by no means always ſo in compound fevers. In the criſis of a ſimple fever the cruſt is entirely carried off from the tongue, and it is left perfectly clean, and in its natural ſtate.

At the ſame time the mouth becomes moiſt, it was dry from the contraction of the ſecretory veſſels of the glands, whoſe excretory ducts open into the mouth in its natural ſtate. There are four large glands, the two carotid, and the two ſubmaxillary which ſecrete the ſaliva at a conſiderable diſtance, and their excretory ducts run a conſiderable way before they terminate in the mouth. In the criſis of a ſimple fever theſe glands ſecrete a larger quantity of ſaliva, but not ſo much as to be thrown out from the mouth. It is proper to obſerve that the fluid theſe glands ſecrete is deſtined to be employed in the ſtomach. If a larger quantity be ſecreted than is uſeful in the ſtomach, it is evacuated by the mouth. The principal purpoſe for which the ſaliva is made uſe of in the ſtomach is for the digeſtion of the food. During the firſt and ſecond ſtages of a ſimple fever no food is thrown into the ſtomach, or if it be it is not digeſted there; although little or no ſaliva be ſecreted, there being no want of it no miſchief enſues. When the criſis has taken place, the appetite is immediately reſtored, and a greater quantity of it paſſes into the ſtomach unperceived. A more copious ſecretion of it has not therefore been obſerved in the criſis of fever, eſpecially in ſimple ones.

There are various other glands ſituated in the mouth which ſecrete mucus; perhaps ſaliva, or ſome other fluids; theſe ſerve to keep the mouth moiſt, which it becomes by degrees in a very compleat manner, in the criſis, eſpecially at the end. But from none of the glands of the mouth is there any ſuch remarkable or copious ſecretion, as from the ſkin or kidneys, nor is there any thing in thoſe ſecreted different from what is found in health.

The thirſt which takes place in fever ariſes partly from the dryneſs of the mouth. The thirſt, ſo far as it depends on this cauſe, muſt, in conſequence of greater ſecretion from theſe glands, be removed. But it alſo depends on the ſtate of the ſtomach, and it alſo has been ſaid to depend partly on the want of fluids in the blood-veſſels. The large evacuation by ſweating which takes place in the criſis of a ſimple fever, evacuating large quantities of watery fluids, occaſions a want of them in the blood-veſſels, and therefore it might be expected to have the ſame effect, as when ſweating is produced by a warm atmoſphere, exerciſe, or any ſuch cauſe. But this is ſo far from being the caſe, that the ſtomach being relieved from the fever, the tongue being moiſt from a greater ſecretion of fluids into it; the thirſt which took place in the firſt and ſecond ſtages of the diſeaſe is carried off; ſo that although the ſweating be profuſe, the patient is relieved from this ſymptom towards the end of the criſis of a ſimple fever.

In the attack of fever, ſuppoſing it to be compleat, leſs bile is ſecreted, leſs pancreatic juice, and there is alſo leſs ſecretion from the mucous glands, and other glands of the inteſtines through the whole inteſtinal canal. When the fever is preſent there is therefore leſs matter to be carried forward by the periſtaltic motion. If food were in the ſtomach when the fever came on, or even if it had got in four or five hours before, no change being made in that food by the ordinary proceſſes of digeſtion, during the paroxyſm of ſimple fever, that part of it which is indigeſtible does not get into the inteſtines, and therefore cannot be carried forward by the periſtaltic motion. The author likewiſe ſuſpects, that the canal itſelf is contracted in the fever, that the food is hardly digeſted till after the fever if it continues only ten or twelve hours. From the food beginning to digeſt towards the end of the criſis, but more by the pancreatic juice, mucus, and other fluids ſecreted into the inteſtinal canal being formed and thrown into it in greater quantity, from the contraction of the canal going off, and the periſtaltic motion returning to its natural ſtate, the evacuation from the inteſtines comes into its natural ſtate, but is not much encreaſed in the criſis of a ſimple fever in common, although in the criſis of compound fevers it is often very conſiderably encreaſed. There is no reaſon for believing any thing is evacuated from the inteſtines different from what is evacuated in health.

Every other ſecretion, beſides thoſe which have been now enumerated returns to its natural ſtate, and very rarely exceeds it in quantity.

When a criſis takes place in a ſimple fever, the feel of obſtruction of the pulſe goes off, but very variouſly. Sometimes the feel of obſtruction begins to diminiſh at the commencement of the criſis, and does not go off entirely until it is quite compleat; ſometimes the criſis continues without any diminution of the feel of obſtruction of the pulſe, till the ſweating has gone on for an hour or two, then goes gradually off, and is entirely removed before the end of the criſis.

The frequency of the pulſe continues almoſt always until near the end of the criſis, and its return to the natural ſtate is often not till towards the end; and after the encreaſe of ſweating, and other ſecretions are entirely gone off. The fulneſs and ſtrength if they took place, always begin to diminiſh at the very firſt beginning of the criſis, and go off before its termination; and indeed towards the end the pulſe becomes weaker than it is in its natural ſtate. The affection of the ſtomach, and depreſſion about the pracordia begin to diminiſh at the beginning of the criſis, and gradually continue to diminiſh, until at laſt, all affection of this kind entirely ceaſes; the pain in the forehead begins to diminiſh at the beginning of the criſis, and is totally carried off before its termination, as is alſo the depreſſion of muſcular ſtrength.

It has already been obſerved, that this depreſſion of muſcular ſtrength is very different from weakneſs, but the exertions that have taken place during the paroxyſm leave the patient exhauſted, ſo that the force of the ſyſtem is not felt to revive, till ſome-time after the criſis has been quite compleated; it then often happens, that the patient falls into a profound and quiet ſleep, after which even the vigor of the body is not perfectly reſtored.

All the other appearances proper to the firſt ſtage of the diſeaſe are carried off compleatly, and then, or rather ſomewhat before, if there were any encreaſed ſecretions they begin to diminiſh, and are entirely reſtored to their natural ſtate, ſo that the whole ſyſtem returns perfectly to its natural ſtate; if it does not, it is not a ſimple fever. For although it may happen in compound fevers, that a criſis may take place, leaving ſome ſymptoms of the firſt or ſecond ſtage, which may go off afterwards without repetition of the fever, yet it never happens in a fever, which compleats its courſe in 8, 10, or 12 hours, that the diſeaſe does not return, if any preternatural appearance whatever, excepting weakneſs, remains after the criſis. If there be any head-ach for inſtance, languor, pain in the ſmall of the back, or in ſhort any other ſlight ſymptom remaining, the fever recurs, and is not a ſimple fever.

Although ſimple fevers continue generally only 8, 10, or 12 hours, yet the firſt ſtage may continue an hour or two before the ſecond takes place, and that may continue four and twenty hours before any appearance of criſis; the criſis may continue with ſlow progreſs twenty-four hours longer, but ſtill it muſt be abſolutely compleat, and the patient muſt be left in perfect health, otherwiſe the diſeaſe certainly recurs; but inſtances of ſo long a ſimple paroxyſm of fever are rare.

A ſimple fever may be terminated in other ways than a criſis, ſo as to be carried off, but then the patient is not freed from diſeaſe, ſo as to return to his natural healthy ſtate. Its termination in other diſeaſes will be noticed in a future diſſertation.

All fevers, according to the author's obſervation, are either the diſeaſe which has been deſcribed, or repetitions of it modified in a great variety of ways, and every enquiry into the hiſtory of the diſeaſe muſt be founded upon a knowledge of ſimple fever. Galen is the only one who has argued whether all fevers are repetitions of ſimple fever with different modifications. All the authors who have treated the ſubject of fever have fallen into confuſion, which can only be avoided by a diſtinct idea of ſimple fever, a deſcription of which has been endeavoured to be given in the above pages. In a future diſſertation the author propoſes to point out the manner in which ſimple fever is repeated with various modifications, ſo as to form all the varieties of the diſeaſe.

FINIS.